Appendix C1

Greenbelt Site Transportation Agreement

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

Greenbelt Site Alternative

Prepared by

Louis Berger

for

GSA

October 2015

FBI Headquarters Consolidation Project
Proposed Methods for Modeling Transportation Impacts at Greenbelt Site
(Greenbelt Site Transportation Agreement)

Trip Generation

Table C1-1: Future Site Trip Generation

Source	Independent Variable	Time Period	IN	OUT	TOTAL
JEH Surveys	11,055 employees	**AM Peak Hour**	2,982	224	3,206
		PM Peak Hour	149	2,825	2,974

Trip Generation Rates: 29.0% during AM and 26.90% during PM (maximum of three day survey)
Peak hour entering/exiting percentages: AM – 93% / 7%, PM – 5% / 95%

Trip Distribution

Trip generation rates are shown in the table below and represent a blend between FBI zip code data and MWCOG trip tables.

Table C1-2: Future Site Trip Distribution

Roadways Serving Study Area	Percent Distribution	AM Peak Hour (vehicle trips)	PM Peak Hour (vehicle trips)
I-95/I-495 North of Site	38.0%	364	329
I-95/I-495 South of Site	40.0%	384	346
MD 201 North of Site	3.0%	29	26
MD 201 South of Site	2.0%	19	17
MD 193 East of Site	4.0%	38	35
MD 193 West of Site	5.0%	48	43
U.S. Route 1 North of Site	8.0%	77	69
TOTAL	100%	959	865

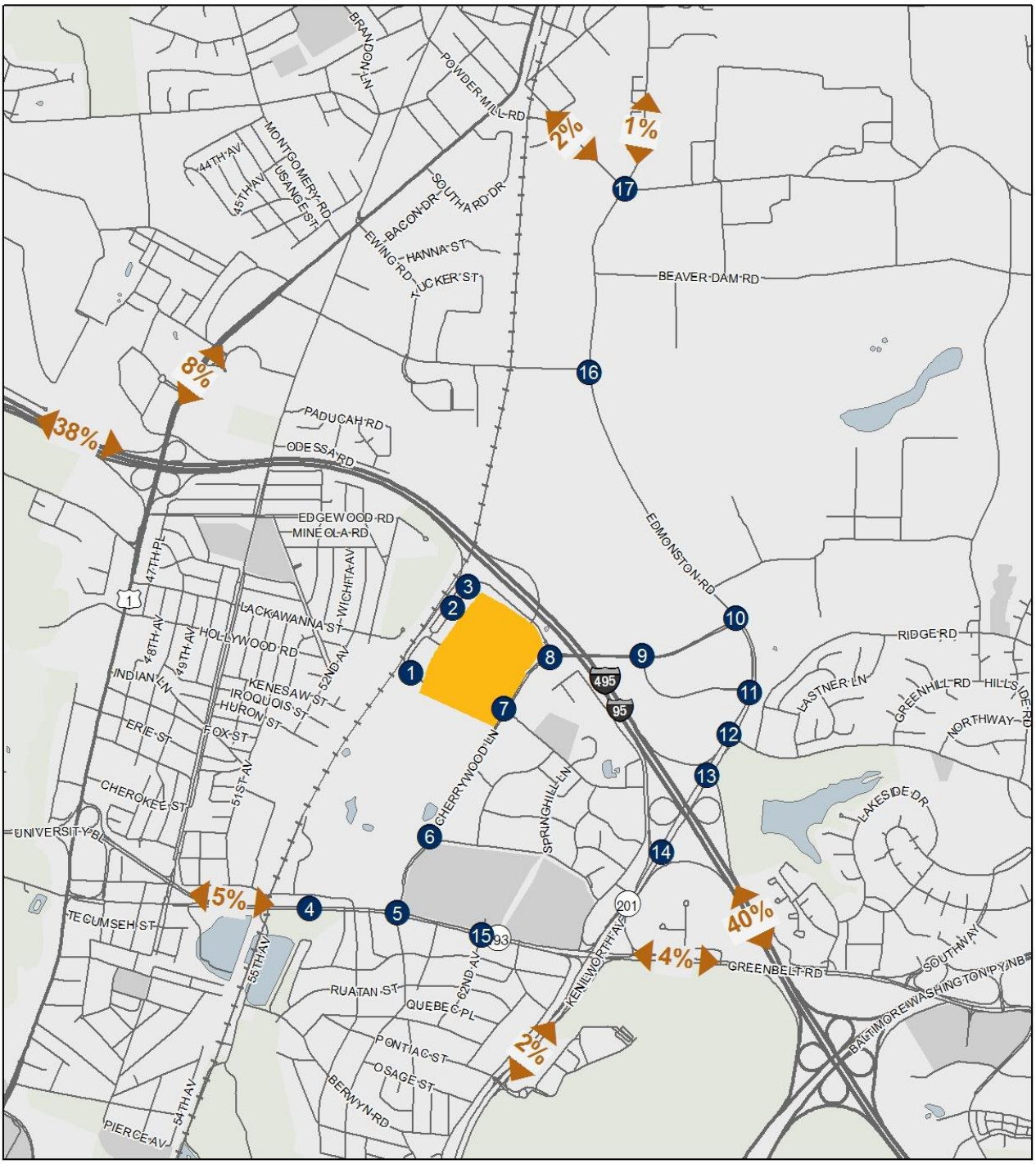
Study Area

The study area will comprise the 17 intersections as shown in the map on Figure C1-1.

An analysis of the Merge/Diverge/Weaves along I-95 / I-495 for the existing/proposed ramps that would serve proposed FBI vehicle trips would include the following locations:

- I-95 southbound to Greenbelt Station (diverge) – AM only
- I-95 northbound to Greenbelt Station (weave) – AM only
- Greenbelt Station to I-95 northbound (weave) – PM only
- Greenbelt Station to I-95 southbound (weave) – PM only

Figure C1-1: Study Area Intersections



Proposed Study Intersections and Distributions

- Proposed Site
- Proposed Study Intersection

0 1,050 2,100 4,200

Feet

1 inch = 2,133 feet

Sources:
ESRI (2013), GSA (2013), DC GIS (2013)

Modal Split

Table C1-3: Modal Split for FBI Consolidation at Greenbelt Site

Mode	FBI Development Percent by Mode	FBI Number of Trips by Mode
Single-Occupancy Vehicles (SOV)	29.67	3,280
Carpool/ Vanpool	11%	405 trips (1,216 persons)
Bicycle	2%	221
Walk	1%	110
Commuter Bus	3%	11 trips (332 persons)
Local Bus	6%	663
Metrorail / Commuter Rail	47.33	5233
Telework / Compressed Work Schedules	0%	0
TOTAL	**100%**	**11,055**

*Assumes an average of three passengers per carpool

Analysis Years

- Existing Condition – 2014
- No-build – 2022
- Build – 2022

Analysis Methods

Synchro/SimTraffic – Intersections

Critical Lane Volume - Intersections

Highway Capacity Software – Highway Facilities

- If LOS D or better for Build Condition only, then no further study required.
- If LOS E or F and less than 5 percent increase in vehicle density when compared to No-build Condition, then no further study required.

TransModeler – AM peak hour inbound gate queue analysis

Background Growth

According to MWCOG model comparison between 2010 and 2025 models, there will be an average of 0.45 percent per year growth on I-95, a 0.6 percent per year growth on MD 201, a 0.5 percent per year growth on Cherrywood Lane, and a zero percent per year growth on MD 193.

According to the historic AADTs maintained by Maryland SHA, all non-interstates had negative trends.

GSA recommends 0.33 percent per year growth rate for all roadways.

Planned Developments

The following developments will be considered part of the No-build Condition:

- North Core
- South Core
- Capital Investment Park

Planned Roadway Improvements

The following planned roadway improvements will be considered part of the No-build Condition:

- New roadways as designed by developer covering the North Core development area
- New ramps between the North Core development and I-95 southbound
- New signalized intersection along MD 193 and South Core driveway
- Cherrywood Lane reduced to one lane in each direction between Metro Access Drive and MD 193

Appendix C2

Traffic Counts

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

Greenbelt Site Alternative

Prepared by

Louis Berger

for

GSA

October 2015

Gorove/Slade Associates

Project Name : Louis Berger
Project # : 2079-013
Location Greenbelt, MD
Data Source: Gorove/Slade Associates, Inc.

Date of Counts: Thursday, March 13, 2014

Intersection:			**Greenbelt Road (MD 193) & Cherrywood Lane/60th Avenue (Signalized)**															
AM PEAK																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**Cherrywood Ln.**				**Greenbelt Rd.**				**Cherrywood Ln.**				**Greenbelt Rd.**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	43	4	29	1	26	255	7	0	2	4	6	0	0	126	31	0
6:45 AM	to	7:00 AM	51	2	18	0	27	320	1	0	6	8	9	0	2	113	27	0
7:00 AM	to	7:15 AM	71	2	24	0	25	451	2	0	3	6	17	0	4	133	35	0
7:15 AM	to	7:30 AM	87	1	23	0	22	495	5	0	2	7	9	0	2	167	34	0
7:30 AM	to	7:45 AM	57	0	44	0	23	455	3	0	3	10	11	0	4	178	55	1
7:45 AM	to	8:00 AM	68	1	41	0	30	426	5	0	6	6	12	0	2	234	68	1
8:00 AM	to	8:15 AM	63	0	37	0	35	397	10	0	7	8	11	0	3	254	44	1
8:15 AM	to	8:30 AM	73	3	29	0	25	385	6	2	12	12	13	0	4	225	60	0
8:30 AM	to	8:45 AM	112	4	29	0	30	499	12	2	7	14	11	0	3	221	68	4
8:45 AM	to	9:00 AM	91	5	32	0	31	356	12	0	6	15	16	0	5	161	52	0
9:00 AM	to	9:15 AM	80	9	50	0	16	296	4	0	4	4	12	0	6	172	44	0
9:15 AM	to	9:30 AM	54	5	26	0	25	266	15	2	8	2	6	0	3	191	64	0
PM PEAK																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**Cherrywood Ln.**				**Greenbelt Rd.**				**Cherrywood Ln.**				**Greenbelt Rd.**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	9	16	12	0	6	316	106	3	110	9	50	2	26	254	7	1
4:15 PM	to	4:30 PM	9	15	0	0	3	415	133	0	131	6	58	0	31	321	15	0
4:30 PM	to	4:45 PM	8	22	11	0	3	415	110	2	149	24	71	0	21	291	15	0
4:45 PM	to	5:00 PM	11	16	16	0	5	413	111	0	132	16	59	0	21	319	6	0
5:00 PM	to	5:15 PM	7	12	11	0	12	453	114	0	140	19	48	1	21	360	18	0
5:15 PM	to	5:30 PM	5	13	12	0	11	446	134	0	134	14	51	0	31	343	22	0
5:30 PM	to	5:45 PM	7	15	12	0	0	474	110	2	95	5	73	0	29	315	8	0
5:45 PM	to	6:00 PM	14	14	11	0	4	431	125	2	137	6	69	0	29	326	12	0
6:00 PM	to	6:15 PM	5	9	17	0	7	421	126	0	125	15	75	0	26	342	13	0
6:15 PM	to	6:30 PM	9	13	13	0	13	366	111	1	190	9	75	0	22	319	14	0
6:30 PM	to	6:45 PM	9	12	15	0	2	413	133	0	140	8	77	0	21	309	11	0
6:45 PM	to	7:00 PM	5	11	11	0	6	319	127	1	160	11	64	0	12	345	5	0
PEAK HOURS																		
		Direction:	Southbound				Westbound				Northbound				Eastbound			
		Roadway:	**Cherrywood Ln.**				**Greenbelt Rd.**				**Cherrywood Ln.**				**Greenbelt Rd.**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:45 AM	to	8:45 AM	32	40	47	0	12	934	240	6	316	8	136	0	120	1707	33	4
PM INTERSECTION PEAK HOUR																		
5:00 PM	to	6:00 PM	33	54	46	0	27	1804	483	4	506	44	241	1	110	1344	60	0
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	32	40	47	0	12	934	240	6	316	8	136	0	120	1707	33	4
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	31	63	50	0	31	1727	469	2	555	73	229	1	94	1313	61	0

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	Cherrywood Ln.				**Greenbelt Rd.**				**Cherrywood Ln.**				**Greenbelt Rd.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.67	0.71	0.90	**0.80**	0.75	0.92	0.88	**0.98**	0.71	0.50	0.83	**0.79**	0.86	0.86	0.69	**0.86**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.70	0.72	0.78	**0.84**	0.65	0.95	0.88	**0.94**	0.93	0.76	0.81	**0.88**	0.76	0.91	0.69	**0.92**

Overall AM PEAK HOUR FACTOR = **0.90** **Overall PM PEAK HOUR FACTOR** = **0.97**

AM Period Intersection Volume: 9356 **PM Period Intersection Volume:** 13636

Gorove/Slade Associates

Project Name : Louis Berger
Project # : 2079-013
Location Greenbelt, MD
Data Source: Gorove/Slade Associates, Inc.

Date of Counts: Wednesday, November 5, 2014

Intersection: **Cherrywood Lane & Breezewood Drive (AWSC)**

AM PEAK			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Cherrywood Ln.**				**Breezewood Drive**				**Cherrywood Ln.**				**No Approach**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	29	3	0	5	0	26	0	12	28	0	0	0	0	0	0
6:45 AM	to	7:00 AM	0	38	2	0	8	0	25	0	13	41	0	0	0	0	0	0
7:00 AM	to	7:15 AM	0	45	3	0	5	0	37	0	16	39	0	0	0	0	0	0
7:15 AM	to	7:30 AM	0	51	6	0	7	0	23	0	12	48	0	0	0	0	0	0
7:30 AM	to	7:45 AM	0	56	5	0	8	0	36	0	23	44	0	0	0	0	0	0
7:45 AM	to	8:00 AM	0	53	7	0	5	0	43	0	26	47	0	0	0	0	0	0
8:00 AM	to	8:15 AM	0	40	6	0	5	0	30	0	26	45	0	0	0	0	0	0
8:15 AM	to	8:30 AM	0	45	4	0	6	0	30	0	36	38	0	0	0	0	0	0
8:30 AM	to	8:45 AM	0	38	7	0	4	0	41	0	46	45	0	0	0	0	0	0
8:45 AM	to	9:00 AM	0	55	11	0	10	0	62	0	44	38	0	0	0	0	0	0
9:00 AM	to	9:15 AM	0	47	3	0	9	0	47	0	36	43	0	0	0	0	0	0
9:15 AM	to	9:30 AM	0	41	3	0	4	0	27	0	21	44	0	1	0	0	0	0

PM PEAK			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Cherrywood Ln.**				**Breezewood Drive**				**Cherrywood Ln.**				**No Approach**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	44	4	0	11	0	42	0	33	42	0	0	0	0	0	0
4:15 PM	to	4:30 PM	0	40	7	0	11	0	33	0	33	49	0	0	0	0	0	0
4:30 PM	to	4:45 PM	0	42	4	0	13	0	28	0	42	56	0	0	0	0	0	0
4:45 PM	to	5:00 PM	0	59	5	0	5	0	20	0	45	72	0	0	0	0	0	0
5:00 PM	to	5:15 PM	0	55	5	0	3	0	19	0	56	71	0	0	0	0	0	0
5:15 PM	to	5:30 PM	0	66	5	0	5	0	23	0	46	66	0	0	0	0	0	0
5:30 PM	to	5:45 PM	0	65	1	0	9	0	34	0	43	73	0	0	0	0	0	0
5:45 PM	to	6:00 PM	0	72	3	0	7	0	25	0	48	59	0	0	0	0	0	0
6:00 PM	to	6:15 PM	0	60	5	0	8	0	36	0	45	56	0	0	0	0	0	0
6:15 PM	to	6:30 PM	0	68	2	0	16	0	38	0	55	81	0	0	0	0	0	0
6:30 PM	to	6:45 PM	0	66	3	0	5	0	32	0	45	60	0	0	0	0	0	0
6:45 PM	to	7:00 PM	0	54	5	0	11	0	30	0	61	63	0	1	0	0	0	0

PEAK HOURS			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Cherrywood Ln.**				**Breezewood Drive**				**Cherrywood Ln.**				**No Approach**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:15 AM	to	9:15 AM	0	185	25	0	29	0	180	0	162	164	0	0	0	0	0	0
PM INTERSECTION PEAK HOUR																		
5:30 PM	to	6:30 PM	0	265	11	0	40	0	133	0	191	269	0	0	0	0	0	0
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	0	176	24	0	20	0	144	0	134	175	0	0	0	0	0	0
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	0	222	19	0	26	0	90	0	189	265	0	0	0	0	0	0

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	Cherrywood Ln.				**Breezewood Drive**				**Cherrywood Ln.**				**No Approach**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.83	0.86	**0.83**	0.83	0.00	0.84	**0.85**	0.73	0.93	0.00	**0.85**	0.00	0.00	0.00	**#DIV/0!**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.84	0.95	**0.85**	0.50	0.00	0.80	**0.71**	0.84	0.92	0.00	**0.89**	0.00	0.00	0.00	**#DIV/0!**

Overall AM PEAK HOUR FACTOR = **0.93**

AM Period Intersection Volume: 1912

PM Period Intersection Volume: 2504

Overall PM PEAK HOUR FACTOR = **0.96**

Gorove/Slade Associates

Project Name : Louis Berger
Project # : 2079-013
Location Greenbelt, MD
Data Source: Gorove/Slade Associates, Inc.

Date of Counts: Wednesday, November 5, 2014

Intersection:			**Cherrywod Lane & Springhill Drive (TWSC)**															
AM PEAK																		
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Cherrywood Lane**				**Springhill Drive**				**Cherrywood Lane**							
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	17	9	0	29	0	9	2	6	41	0	5	0	0	0	0
6:45 AM	to	7:00 AM	0	28	14	0	24	0	11	0	13	40	0	4	0	0	0	0
7:00 AM	to	7:15 AM	0	31	16	0	30	0	16	0	10	38	0	8	0	0	0	0
7:15 AM	to	7:30 AM	0	38	21	1	29	0	23	0	16	51	0	2	0	0	0	0
7:30 AM	to	7:45 AM	0	26	12	0	22	0	22	0	19	43	0	4	0	0	0	0
7:45 AM	to	8:00 AM	0	39	13	0	26	0	22	0	12	42	0	2	0	0	0	0
8:00 AM	to	8:15 AM	0	32	15	0	23	0	7	0	8	42	0	10	0	0	0	0
8:15 AM	to	8:30 AM	0	32	16	0	16	0	10	0	5	45	0	9	0	0	0	0
8:30 AM	to	8:45 AM	0	44	12	0	23	0	9	0	10	42	0	3	0	0	0	0
8:45 AM	to	9:00 AM	0	36	11	0	18	0	13	0	10	42	0	7	0	0	0	0
9:00 AM	to	9:15 AM	0	26	8	0	21	0	16	0	12	37	0	2	0	0	0	0
9:15 AM	to	9:30 AM	0	25	10	0	19	0	9	0	16	33	0	5	0	0	0	0
PM PEAK																		
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Cherrywood Lane**				**Springhill Drive**				**Cherrywood Lane**							
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	43	12	0	13	0	13	0	18	32	0	4	0	0	0	0
4:15 PM	to	4:30 PM	0	58	16	0	14	0	10	0	18	45	0	6	0	0	0	0
4:30 PM	to	4:45 PM	0	53	26	0	22	0	20	0	18	51	0	14	0	0	0	0
4:45 PM	to	5:00 PM	0	59	17	0	22	0	23	0	20	48	0	5	0	0	0	0
5:00 PM	to	5:15 PM	0	73	19	0	26	0	10	0	33	36	0	7	0	0	0	0
5:15 PM	to	5:30 PM	0	65	15	0	18	0	23	0	15	53	0	3	0	0	0	0
5:30 PM	to	5:45 PM	0	73	24	0	14	0	14	0	27	54	0	3	0	0	0	0
5:45 PM	to	6:00 PM	0	64	15	0	21	0	14	0	21	34	0	2	0	0	0	0
6:00 PM	to	6:15 PM	0	83	18	0	14	0	12	0	18	42	0	3	0	0	0	0
6:15 PM	to	6:30 PM	0	69	24	0	20	0	17	0	18	70	0	2	0	0	0	0
6:30 PM	to	6:45 PM	0	65	13	0	19	0	6	0	20	48	0	1	0	0	0	0
6:45 PM	to	7:00 PM	0	60	16	0	19	0	15	0	17	51	0	6	0	0	0	0
PEAK HOURS																		
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Cherrywood Lane**				**Springhill Drive**				**Cherrywood Lane**							
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:00 AM	to	8:00 AM	0	134	62	1	107	0	83	0	57	174	0	16	0	0	0	0
PM INTERSECTION PEAK HOUR																		
4:45 PM	to	5:45 PM	0	270	75	0	80	0	70	0	95	191	0	81	0	0	0	0
AM SYSTEM PEAK HOUR													13					
7:45 AM	to	8:45 AM	0	147	56	0	88	0	48	0	35	171	0	24	0	0	0	0
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	0	250	77	0	88	0	76	0	86	188	0	29	0	0	0	0

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	Cherrywood Lane				**Springhill Drive**				**Cherrywood Lane**							
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.84	0.88	**0.91**	0.85	0.00	0.55	**0.71**	0.73	0.95	0.00	**0.95**	0.00	0.00	0.00	**#DIV/0!**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.86	0.74	**0.89**	0.85	0.00	0.83	**0.91**	0.65	0.89	0.00	**0.99**	0.00	0.00	0.00	**#DIV/0!**

Overall AM PEAK HOUR FACTOR = **0.88** **Overall PM PEAK HOUR FACTOR** = **0.97**

AM Period Intersection Volume: 1611 **PM Period Intersection Volume:** 2186

Gorove/Slade Associates

Project Name : Louis Berger
Project # : 2079-013
Location Greenbelt, MD
Data Source: Gorove/Slade Associates, Inc.

Date of Counts: Thursday, March 13, 2014

Intersection: **Cherrywood Lane & Greenbelth Metro Drive (Roundabout)**

AM PEAK			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Metro Station Drive**				**Cherrywood Ln.**				**No Approach**				**Cherrywood Ln.**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	15	0	28	2	68	12	0	0	0	0	0	0	0	33	26	2
6:45 AM	to	7:00 AM	14	0	27	2	78	17	0	0	0	0	0	0	0	30	31	0
7:00 AM	to	7:15 AM	20	0	36	3	141	26	0	0	0	0	0	0	0	24	31	0
7:15 AM	to	7:30 AM	21	0	38	3	100	39	0	0	0	0	0	0	0	34	20	0
7:30 AM	to	7:45 AM	21	0	28	1	124	31	0	0	0	0	0	0	0	44	42	1
7:45 AM	to	8:00 AM	28	0	36	1	109	23	0	0	0	0	0	0	0	42	43	0
8:00 AM	to	8:15 AM	23	0	27	2	108	31	0	0	0	0	0	0	0	34	37	0
8:15 AM	to	8:30 AM	19	0	39	3	86	32	0	0	0	0	0	0	0	32	33	0
8:30 AM	to	8:45 AM	17	0	27	1	58	41	0	0	0	0	0	0	0	41	23	0
8:45 AM	to	9:00 AM	17	0	23	4	60	34	0	0	0	0	0	0	0	35	19	0
9:00 AM	to	9:15 AM	15	0	20	0	55	23	0	0	0	0	0	0	0	33	20	0
9:15 AM	to	9:30 AM	11	0	18	0	41	37	0	0	0	0	0	0	0	24	11	0
PM PEAK			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Metro Station Drive**				**Cherrywood Ln.**				**No Approach**				**Cherrywood Ln.**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	23	0	42	7	30	67	0	0	0	0	0	0	0	49	17	0
4:15 PM	to	4:30 PM	34	0	41	7	37	107	0	0	0	0	0	0	0	57	20	0
4:30 PM	to	4:45 PM	26	0	53	4	25	80	0	0	0	0	0	0	0	67	20	1
4:45 PM	to	5:00 PM	32	0	63	3	27	97	1	0	0	0	0	0	0	59	21	0
5:00 PM	to	5:15 PM	33	0	62	3	41	82	0	0	0	0	0	0	0	42	24	1
5:15 PM	to	5:30 PM	35	0	83	7	26	87	0	0	0	0	0	0	0	54	27	2
5:30 PM	to	5:45 PM	57	0	73	3	37	93	0	0	0	0	0	0	0	54	21	0
5:45 PM	to	6:00 PM	34	0	69	3	39	75	0	0	0	0	0	0	1	46	25	0
6:00 PM	to	6:15 PM	68	0	107	8	27	91	0	2	0	0	0	0	0	57	24	0
6:15 PM	to	6:30 PM	51	0	97	6	36	105	0	0	0	0	0	0	0	50	20	0
6:30 PM	to	6:45 PM	60	0	85	7	34	95	0	0	0	0	0	0	0	47	22	1
6:45 PM	to	7:00 PM	45	0	64	5	24	104	0	0	0	0	0	0	0	52	21	0
PEAK HOURS			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Metro Station Drive**				**Cherrywood Ln.**				**No Approach**				**Cherrywood Ln.**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:00 AM	to	8:00 AM	90	0	138	8	474	119	0	0	0	0	0	0	0	144	136	1
PM INTERSECTION PEAK HOUR																		
6:00 PM	to	7:00 PM	213	0	358	24	136	366	0	2	0	0	0	0	1	200	91	1
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	87	0	129	7	361	127	0	0	0	0	0	0	0	149	136	0
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	126	0	261	17	119	346	1	0	0	0	0	0	0	222	92	4

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	Metro Station Drive				**Cherrywood Ln.**				**No Approach**				**Cherrywood Ln.**			
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.78	0.00	0.83	**0.84**	0.83	0.77	0.00	**0.88**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.89	0.79	**0.84**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.90	0.00	0.79	**0.82**	0.73	0.89	0.25	**0.93**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.83	0.85	**0.90**

Overall AM PEAK HOUR FACTOR = **0.88** **Overall PM PEAK HOUR FACTOR** = **0.94**

AM Period Intersection Volume: 2684 **PM Period Intersection Volume:** 3701

Gorove/Slade Associates

Project Name :	Louis Berger
Project # :	2079-013
Location	Greenbelt, MD
Data Source:	Gorove/Slade Associates, Inc.

Wednesday, November 5, 2014

Intersection: **Cherrywood Lane & Ivy Lane (TWSC)**

AM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:							**Cherrywood Lane**				**Ivy Lane**				**Cherrywood Lane**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	0	0	0	0	99	0	0	1	0	5	0	25	38	0	1
6:45 AM	to	7:00 AM	0	0	0	0	0	114	3	0	1	0	11	0	28	47	0	1
7:00 AM	to	7:15 AM	0	0	0	0	0	144	3	0	2	0	10	0	20	32	0	2
7:15 AM	to	7:30 AM	0	0	0	0	0	155	2	0	3	0	13	0	24	72	0	0
7:30 AM	to	7:45 AM	0	0	0	0	0	135	5	0	2	0	12	0	20	56	0	0
7:45 AM	to	8:00 AM	0	0	0	0	0	153	7	0	5	0	27	0	23	46	0	2
8:00 AM	to	8:15 AM	0	0	0	0	0	146	10	0	7	0	13	0	20	53	0	1
8:15 AM	to	8:30 AM	0	0	0	0	0	117	9	0	5	0	15	0	26	39	1	0
8:30 AM	to	8:45 AM	0	0	0	0	0	119	11	0	4	0	10	0	30	54	0	0
8:45 AM	to	9:00 AM	0	0	0	0	0	99	10	0	2	0	13	0	20	36	0	2
9:00 AM	to	9:15 AM	0	0	0	0	0	64	9	0	4	0	7	0	24	46	0	0
9:15 AM	to	9:30 AM	0	0	0	0	0	58	9	0	5	0	7	0	17	40	0	1

PM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:							**Cherrywood Lane**				**Ivy Lane**				**Cherrywood Lane**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	0	0	0	0	53	4	0	9	0	9	0	17	66	0	1
4:15 PM	to	4:30 PM	0	0	0	0	0	64	7	0	4	0	16	0	19	91	0	0
4:30 PM	to	4:45 PM	0	0	0	0	0	65	1	0	7	0	14	0	26	69	0	0
4:45 PM	to	5:00 PM	0	0	0	0	0	59	3	0	6	0	14	0	28	107	0	1
5:00 PM	to	5:15 PM	0	0	0	0	0	65	4	0	19	0	29	0	27	92	0	3
5:15 PM	to	5:30 PM	0	0	0	0	0	65	3	0	8	0	20	0	26	116	0	0
5:30 PM	to	5:45 PM	0	0	0	0	0	80	3	0	5	0	18	0	21	118	0	0
5:45 PM	to	6:00 PM	0	0	0	0	0	69	3	0	8	0	20	0	21	111	0	0
6:00 PM	to	6:15 PM	0	0	0	0	0	80	0	0	4	0	22	0	32	124	0	0
6:15 PM	to	6:30 PM	0	0	0	0	0	84	4	0	0	0	19	0	33	116	0	0
6:30 PM	to	6:45 PM	0	0	0	0	0	61	2	0	3	0	11	0	38	103	0	0
6:45 PM	to	7:00 PM	0	0	0	0	0	50	2	0	5	0	12	0	13	77	0	0

PEAK HOURS

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:							**Cherrywood Lane**				**Ivy Lane**				**Cherrywood Lane**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:15 AM	to	8:15 AM	0	0	0	0	0	589	24	0	17	0	65	0	87	227	0	3
PM INTERSECTION PEAK HOUR																		
5:30 PM	to	6:30 PM	0	0	0	0	0	313	10	0	17	0	79	0	107	469	0	0
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	0	0	0	0	0	535	37	0	21	0	65	0	99	192	1	3
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	0	0	0	0	0	254	11	0	40	0	77	0	107	384	0	4

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
					Cherrywood Lane				**Ivy Lane**				**Cherrywood Lane**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.00	0.87	0.84	**0.89**	0.75	0.00	0.60	**0.67**	0.83	0.89	0.25	**0.87**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.00	0.00	**#DIV/0!**	0.00	0.98	0.69	**0.96**	0.53	0.00	0.66	**0.61**	0.96	0.83	0.00	**0.86**

Overall AM PEAK HOUR FACTOR = **0.91** **Overall PM PEAK HOUR FACTOR** = **0.92**

AM Period Intersection Volume: 2502 **PM Period Intersection Volume:** 2604

Gorove/Slade Associates

Project Name : Louis Berger
Project # : 2079-013
Location Greenbelt, MD
Data Source: Gorove/Slade Associates, Inc.

Date of Counts: Tuesday, February 24, 2015

Intersection: **Greenbelt Road (MD 193) & 62 Avenue/Beltway Plaza Driveway (Signalized)**

AM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:			**Shopping Center Entrance**				**Greenbelt Rd.**				**62nd Avenue**				**Greenbelt Rd.**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	0	2	0	8	234	1	0	4	0	0	0	0	124	0	1
6:45 AM	to	7:00 AM	0	0	2	0	10	351	3	1	5	0	1	1	1	127	0	0
7:00 AM	to	7:15 AM	0	0	4	0	8	389	5	0	4	0	2	0	2	138	0	0
7:15 AM	to	7:30 AM	1	0	0	0	3	366	9	0	4	0	2	0	7	155	0	0
7:30 AM	to	7:45 AM	0	0	1	1	10	377	5	0	4	0	6	0	2	195	0	0
7:45 AM	to	8:00 AM	0	1	4	3	15	461	10	0	5	1	3	0	3	217	1	1
8:00 AM	to	8:15 AM	2	0	7	3	15	416	9	0	4	1	3	2	8	246	3	0
8:15 AM	to	8:30 AM	2	0	9	1	21	380	6	0	15	0	5	0	6	226	3	0
8:30 AM	to	8:45 AM	5	0	11	0	22	354	14	0	4	1	4	0	6	266	2	0
8:45 AM	to	9:00 AM	5	0	4	3	34	363	20	1	12	1	8	0	12	224	3	0
9:00 AM	to	9:15 AM	6	1	9	2	23	367	12	1	15	4	9	0	7	221	1	0
9:15 AM	to	9:30 AM	2	1	19	1	45	302	15	0	6	2	5	0	7	213	4	0

PM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:			**Shopping Center Entrance**				**Greenbelt Rd.**				**62nd Avenue**				**Greenbelt Rd.**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	3	6	63	2	87	292	10	0	20	8	13	0	4	392	14	1
4:15 PM	to	4:30 PM	15	1	67	2	99	267	13	0	15	4	6	0	3	418	10	1
4:30 PM	to	4:45 PM	16	4	79	3	80	295	11	0	24	3	10	0	5	443	14	0
4:45 PM	to	5:00 PM	20	3	77	4	113	325	12	0	20	2	14	1	6	466	12	4
5:00 PM	to	5:15 PM	12	3	69	4	97	352	17	0	12	7	15	0	4	493	8	4
5:15 PM	to	5:30 PM	18	2	79	2	83	325	11	1	15	6	9	0	4	447	12	0
5:30 PM	to	5:45 PM	9	9	68	2	107	352	16	0	16	3	4	0	4	453	12	1
5:45 PM	to	6:00 PM	16	5	75	2	85	392	16	0	21	6	9	0	5	431	11	0
6:00 PM	to	6:15 PM	14	4	82	0	106	424	14	3	14	2	7	0	5	402	12	0
6:15 PM	to	6:30 PM	14	2	65	1	78	399	9	4	18	2	11	0	3	427	11	0
6:30 PM	to	6:45 PM	15	3	63	0	101	409	15	1	14	1	5	0	0	369	11	0
6:45 PM	to	7:00 PM	10	5	75	4	90	371	13	0	16	4	6	0	2	348	11	2

PEAK HOURS

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:			**Shopping Center Entrance**				**Greenbelt Rd.**				**62nd Avenue**				**Greenbelt Rd.**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:45 AM	to	8:45 AM	9	1	31	7	73	1611	39	0	28	3	15	2	23	955	9	1
PM INTERSECTION PEAK HOUR																		
5:30 PM	to	6:30 PM	53	20	290	5	376	1567	55	7	69	13	31	0	17	1713	46	1
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	9	1	31	7	73	1611	39	0	28	3	15	2	23	955	9	1
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	66	12	304	13	373	1297	51	1	71	18	48	1	19	1849	46	8

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	Shopping Center Entrance				**Greenbelt Rd.**				**62nd Avenue**				**Greenbelt Rd.**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.45	0.25	0.70	**0.64**	0.83	0.87	0.70	**0.89**	0.47	0.75	0.75	**0.58**	0.72	0.90	0.75	**0.90**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.83	0.75	0.96	**0.96**	0.83	0.92	0.75	**0.92**	0.74	0.64	0.80	**0.93**	0.79	0.94	0.82	**0.95**

Overall AM PEAK HOUR FACTOR = **0.97** **Overall PM PEAK HOUR FACTOR** = **0.95**

AM Period Intersection Volume: 7351 **PM Period Intersection Volume:** 12191

Gorove/Slade Associates

Project Name :	Louis Berger
Project # :	2079-013
Location	Greenbelt, MD
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Thursday, April 03, 2014

Intersection: **Kenilworth Avenue (MD 201) & I-95/I-495 SB Off-ramp (Signalized)**

AM PEAK																	
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Kennilworth Ave.**				**No Approach**				**Kennilworth Ave.**				**495 Off-Ramp**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	76	289							85	131			274		12	
6:45 AM	to	7:00 AM	80	302							102	195			283		23	
7:00 AM	to	7:15 AM	97	343							82	169			235		14	
7:15 AM	to	7:30 AM	104	372							72	119			270		24	
7:30 AM	to	7:45 AM	130	364							126	123			295		36	
7:45 AM	to	8:00 AM	109	375							120	118			349		49	
8:00 AM	to	8:15 AM	142	458							108	125			364		48	
8:15 AM	to	8:30 AM	135	462							119	145			349		54	
8:30 AM	to	8:45 AM	134	398							119	118			289		42	
8:45 AM	to	9:00 AM	151	433							94	91			322		38	
9:00 AM	to	9:15 AM	104	366							106	111			252		62	
9:15 AM	to	9:30 AM	122	302							92	89			241		40	
PM PEAK																		
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Kennilworth Ave.**				**No Approach**				**Kennilworth Ave.**				**495 Off-Ramp**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	155	252							166	104			215		23	
4:15 PM	to	4:30 PM	185	263							183	126			236		21	
4:30 PM	to	4:45 PM	190	263							210	135			211		26	
4:45 PM	to	5:00 PM	179	297							237	148			135		14	
5:00 PM	to	5:15 PM	228	312							244	150			153		20	
5:15 PM	to	5:30 PM	225	306							219	168			242		28	
5:30 PM	to	5:45 PM	179	386							223	201			198		30	
5:45 PM	to	6:00 PM	160	384							177	177			239		28	
6:00 PM	to	6:15 PM	151	291							174	203			245		25	
6:15 PM	to	6:30 PM	137	303							157	152			230		33	
6:30 PM	to	6:45 PM	106	249							164	141			264		34	
6:45 PM	to	7:00 PM	129	239							142	132			190		28	
PEAK HOURS																		
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Kennilworth Ave.**				**No Approach**				**Kennilworth Ave.**				**495 Off-Ramp**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:00 AM	to	9:00 AM	562	1751	0	0	0	0	0	0	440	479	0	0	1324	0	182	0
PM INTERSECTION PEAK HOUR																		
5:00 PM	to	6:00 PM	792	1388	0	0	0	0	0	0	863	696	0	0	832	0	106	0
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	520	1693	0	0	0	0	0	0	466	506	0	0	1351	0	193	0
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	822	1178	0	0	0	0	0	0	910	601	0	0	741	0	88	0

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	Kennilworth Ave.				**No Approach**				**Kennilworth Ave.**				**495 Off-Ramp**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.92	0.92	0.00	**0.92**	0.00	0.00	0.00	**#DIV/0!**	0.97	0.87	0.00	**0.92**	0.93	0.00	0.89	**0.94**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.90	0.94	0.00	**0.93**	0.00	0.00	0.00	**#DIV/0!**	0.93	0.89	0.00	**0.96**	0.77	0.00	0.79	**0.77**

Overall AM PEAK HOUR FACTOR = **0.94** **Overall PM PEAK HOUR FACTOR** = **0.91**

AM Period Intersection Volume: 12572 **PM Period Intersection Volume:** 12570

Gorove/Slade Associates

Project Name : Louis Berger
Project # : 2079-013
Location Greenbelt, MD
Data Source: Gorove/Slade Associates, Inc.

Thursday, March 13, 2014

Intersection: **Kenilworth Avenue (MD 201) & I-95/I-495 NB Off-ramp (Signalized)**

AM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:			**Kenninlworth Ave.**				**Exit Ramp**				**Kenninlworth Ave.**				**No Approach**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	0	191	0	0	190	0	109	0		72	0	0	0	0	0	0
6:45 AM	to	7:00 AM	0	197	0	0	178	0	110	0		91	0	0	0	0	0	0
7:00 AM	to	7:15 AM	0	222	0	0	174	0	146	1	45	99	0	0	0	0	0	0
7:15 AM	to	7:30 AM	0	243	0	0	219	0	225	0	124	93	0	0	0	0	0	0
7:30 AM	to	7:45 AM	0	248	0	0	172	0	203	0	113	129	0	0	0	0	0	0
7:45 AM	to	8:00 AM	0	256	0	0	210	0	216	1	103	136	0	0	0	0	0	0
8:00 AM	to	8:15 AM	0	266	0	0	179	0	195	0	107	146	0	0	0	0	0	0
8:15 AM	to	8:30 AM	0	254	0	0	206	0	195	0	118	149	0	0	0	0	0	0
8:30 AM	to	8:45 AM	0	256	0	0	213	0	220	0	115	124	0	0	0	0	0	0
8:45 AM	to	9:00 AM	0	278	0	0	209	0	220	0	86	159	0	0	0	0	0	0
9:00 AM	to	9:15 AM	0	243	0	0	173	0	221	0	95	155	0	0	0	0	0	0
9:15 AM	to	9:30 AM	0	207	0	0	184	0	166	0	78	123	0	0	0	0	0	0

PM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:			**Kenninlworth Ave.**				**Exit Ramp**				**Kenninlworth Ave.**				**No Approach**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	299	0	0	170	0	145	0	144	224	0	0	0	0	0	0
4:15 PM	to	4:30 PM	0	315	0	0	146	0	138	0	159	219	0	0	0	0	0	0
4:30 PM	to	4:45 PM	0	307	0	0	121	0	148	0	163	196	0	0	0	0	0	0
4:45 PM	to	5:00 PM	0	309	0	0	124	0	154	0	186	195	0	0	0	0	0	0
5:00 PM	to	5:15 PM	0	295	0	0	145	0	138	0	172	165	0	0	0	0	0	0
5:15 PM	to	5:30 PM	0	303	0	0	116	0	119	0	182	143	0	0	0	0	0	0
5:30 PM	to	5:45 PM	0	283	0	0	133	0	127	0	175	151	0	1	0	0	0	0
5:45 PM	to	6:00 PM	0	292	0	0	112	0	120	0	179	236	0	0	0	0	0	0
6:00 PM	to	6:15 PM	0	259	0	0	124	0	146	0	185	219	0	0	0	0	0	0
6:15 PM	to	6:30 PM	0	254	0	0	107	9	156	3	131	222	0	0	0	0	0	0
6:30 PM	to	6:45 PM	0	251	0	0	119	0	186	0	117	186	0	0	0	0	0	0
6:45 PM	to	7:00 PM	0	229	0	0	147	2	145	0	113	185	0	0	0	0	0	0

PEAK HOURS

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:			**Kenninlworth Ave.**				**Exit Ramp**				**Kenninlworth Ave.**				**No Approach**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:00 AM	to	9:00 AM	0	1054	0	0	807	0	830	0	426	578	0	0	0	0	0	0
PM INTERSECTION PEAK HOUR																		
4:00 PM	to	5:00 PM	0	1230	0	0	561	0	585	0	652	834	0	0	0	0	0	0
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	0	1032	0	0	808	0	826	1	443	555	0	0	0	0	0	0
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	0	1214	0	0	506	0	559	0	703	699	0	0	0	0	0	0

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	Kenninlworth Ave.				**Exit Ramp**				**Kenninlworth Ave.**				**No Approach**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.00	0.97	0.00	**0.97**	0.95	0.00	0.94	**0.94**	0.94	0.93	0.00	**0.93**	0.00	0.00	0.00	**#DIV/0!**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.00	0.98	0.00	**0.98**	0.87	0.00	0.91	**0.94**	0.94	0.89	0.00	**0.92**	0.00	0.00	0.00	**#DIV/0!**

Overall AM PEAK HOUR FACTOR = **0.99** **Overall PM PEAK HOUR FACTOR** = **0.95**

AM Period Intersection Volume: 9854 **PM Period Intersection Volume:** 10940

Gorove/Slade Associates

Project Name : Louis Berger
Project # : 2079-013
Location Greenbelt, MD
Data Source: SHA Count

Date of Counts: Wednesday, November 5, 2014

Intersection: **Kenilworth Avenue (MD 201) & Crescent Road/Maryland SHA Office (Signalized)**

AM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**MD 201**				**Crescent Road**				**MD 201**				**SHA Office**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	1	189	10	0	18	1	28	0	7	262	6	0	1	0	0	0
6:45 AM	to	7:00 AM	3	243	8	0	30	1	41	0	14	364	7	0	0	0	0	0
7:00 AM	to	7:15 AM	1	204	15	0	23	2	60	1	12	313	7	0	0	0	0	0
7:15 AM	to	7:30 AM	0	248	15	0	28	0	44	2	20	281	7	0	2	0	0	0
7:30 AM	to	7:45 AM	1	289	15	0	34	1	65	0	11	299	12	0	0	0	0	0
7:45 AM	to	8:00 AM	3	252	15	0	43	1	68	0	14	325	8	0	2	0	0	0
8:00 AM	to	8:15 AM	6	289	21	0	34	1	70	0	36	307	10	0	4	0	0	0
8:15 AM	to	8:30 AM	2	271	23	0	34	0	64	0	24	339	13	0	4	1	0	0
8:30 AM	to	8:45 AM	9	283	21	0	25	0	74	0	24	329	12	0	4	0	0	0
8:45 AM	to	9:00 AM	5	303	20	0	28	2	51	0	33	378	11	0	3	0	1	0
9:00 AM	to	9:15 AM	3	247	25	0	24	2	58	1	20	315	11	0	3	1	0	0
9:15 AM	to	9:30 AM	2	253	16	0	30	1	41	0	26	283	12	0	8	0	0	0

PM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**MD 201**				**Crescent Road**				**MD 201**				**SHA Office**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	0	351	26	0	20	0	32	2	42	295	5	0	7	0	2	0
4:15 PM	to	4:30 PM	1	360	47	0	21	0	20	3	43	220	5	0	6	3	3	0
4:30 PM	to	4:45 PM	1	359	35	0	19	0	22	0	42	294	2	0	8	1	2	0
4:45 PM	to	5:00 PM	0	340	74	0	25	1	33	0	53	279	1	0	6	0	2	0
5:00 PM	to	5:15 PM	0	412	49	0	24	0	35	1	50	234	3	0	4	0	0	0
5:15 PM	to	5:30 PM	0	427	53	0	19	0	28	1	53	259	7	0	0	0	1	0
5:30 PM	to	5:45 PM	1	378	56	0	22	1	25	0	57	250	4	0	1	0	2	0
5:45 PM	to	6:00 PM	0	383	63	0	19	0	24	1	45	233	4	0	1	0	0	0
6:00 PM	to	6:15 PM	1	367	48	0	21	0	22	0	52	267	9	0	5	0	1	0
6:15 PM	to	6:30 PM	0	345	47	0	24	0	18	0	37	225	6	0	3	0	0	0
6:30 PM	to	6:45 PM	0	289	51	0	8	0	28	0	64	237	3	0	0	0	0	0
6:45 PM	to	7:00 PM	0	202	37	0	17	0	26	0	50	233	3	0	0	0	0	0

PEAK HOURS

			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**MD 201**				**Crescent Road**				**MD 201**				**SHA Office**			
		Movement:	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:00 AM	to	9:00 AM	22	1146	85	0	121	3	259	0	117	1353	46	0	15	1	1	0
PM INTERSECTION PEAK HOUR																		
4:45 PM	to	5:45 PM	1	1557	232	0	90	2	121	2	213	1022	15	0	11	0	5	0
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	20	1095	80	0	136	2	276	0	98	1300	43	0	14	1	0	0
Approach Total				1195				414				1441				15		
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	1	1538	211	0	87	1	118	2	198	1066	13	0	18	1	5	0

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	MD 201				**Crescent Road**				**MD 201**				**SHA Office**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.56	0.95	0.87	**0.95**	0.79	0.50	0.93	**0.92**	0.68	0.96	0.83	**0.96**	0.88	0.25	0.00	**0.75**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.25	0.90	0.71	**0.91**	0.87	0.25	0.84	**0.87**	0.93	0.91	0.46	**0.94**	0.56	0.25	0.63	**0.55**

Overall AM PEAK HOUR FACTOR = **0.98** **Overall PM PEAK HOUR FACTOR** = **0.96**

AM Period Intersection Volume: 8524 **PM Period Intersection Volume:** 9081

Gorove/Slade Associates

	Louis Berger
Project # :	2079-013
Location	Greenbelt, MD
Data Source:	Gorove/Slade Associates, Inc.

Date of Counts: Wednesday, November 5, 2014

Intersection: **Kenilworth Avenue (MD 201) & Ivy Lane (Signalized)**

AM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Kenilworth Avenue**				**No Approach**				**Kenilworth Avenue**				**Ivy Lane**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	2	177	0	0	0	0	0	0	0	271	17	0	25	0	0	0
6:45 AM	to	7:00 AM	0	206	0	0	0	0	0	0	0	350	29	0	27	0	0	0
7:00 AM	to	7:15 AM	1	212	1	0	0	0	0	0	0	296	33	0	23	0	0	0
7:15 AM	to	7:30 AM	6	230	0	0	0	0	0	0	0	285	40	0	32	0	0	0
7:30 AM	to	7:45 AM	4	264	0	0	0	0	0	0	0	261	51	0	25	0	0	1
7:45 AM	to	8:00 AM	12	242	0	0	0	0	0	0	0	301	70	0	31	0	0	0
8:00 AM	to	8:15 AM	7	285	0	0	0	0	0	0	0	269	80	0	35	0	0	0
8:15 AM	to	8:30 AM	6	245	0	0	0	0	0	0	0	282	94	0	34	0	0	0
8:30 AM	to	8:45 AM	8	284	0	0	0	0	0	0	0	243	89	0	34	0	0	0
8:45 AM	to	9:00 AM	13	284	0	0	0	0	0	0	0	296	104	0	25	0	0	0
9:00 AM	to	9:15 AM	5	265	0	0	0	0	0	1	0	221	124	0	34	0	0	0
9:15 AM	to	9:30 AM	6	221	0	0	0	0	0	0	0	215	89	0	26	0	0	0

PM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Kenilworth Avenue**				**No Approach**				**Kenilworth Avenue**				**Ivy Lane**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	2	300	0	0	0	0	0	0	0	291	20	0	66	0	0	0
4:15 PM	to	4:30 PM	4	341	0	0	0	0	0	0	0	231	22	0	72	0	0	0
4:30 PM	to	4:45 PM	2	305	0	0	0	0	0	0	0	279	32	0	68	0	0	0
4:45 PM	to	5:00 PM	2	323	0	0	0	0	0	0	0	288	29	0	70	0	0	0
5:00 PM	to	5:15 PM	3	341	0	0	0	0	0	0	0	242	27	0	152	0	0	0
5:15 PM	to	5:30 PM	2	343	0	0	0	0	0	0	0	233	40	0	116	0	0	0
5:30 PM	to	5:45 PM	6	309	1	0	0	0	0	0	0	259	29	0	118	0	0	0
5:45 PM	to	6:00 PM	6	343	1	0	0	0	0	0	0	231	26	2	98	0	0	0
6:00 PM	to	6:15 PM	5	313	1	0	0	0	0	0	0	234	35	0	102	0	0	0
6:15 PM	to	6:30 PM	2	322	0	0	0	0	0	0	0	224	28	0	75	0	0	0
6:30 PM	to	6:45 PM	2	260	0	0	0	0	0	1	0	230	28	0	75	0	0	0
6:45 PM	to	7:00 PM	2	197	1	0	0	0	0	0	0	201	37	0	51	0	0	0

PEAK HOURS

			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Kenilworth Avenue**				**No Approach**				**Kenilworth Avenue**				**Ivy Lane**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:00 AM	to	9:00 AM	34	1098	0	0	0	0	0	0	0	1090	367	0	128	0	0	0
PM INTERSECTION PEAK HOUR																		
4:45 PM	to	5:45 PM	13	1316	1	0	0	0	0	0	0	1022	125	0	456	0	0	0
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	33	1056	0	0	0	0	0	0	0	1095	333	0	134	0	0	0
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	9	1312	0	0	0	0	0	0	0	1042	128	0	406	0	0	0

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	Kenilworth Avenue				**No Approach**				**Kenilworth Avenue**				**Ivy Lane**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.69	0.93	0.00	**0.93**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.91	0.89	**0.95**	0.96	0.00	0.00	**0.96**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.75	0.96	0.00	**0.96**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.90	0.80	**0.92**	0.67	0.00	0.00	**0.67**

Overall AM PEAK HOUR FACTOR = **0.98** **Overall PM PEAK HOUR FACTOR** = **0.95**

AM Period Intersection Volume: 7447 **PM Period Intersection Volume:** 8098

Gorove/Slade Associates

Project Name : Louis Berger
Project # : 2079-013
Location Greenbelt, MD
Data Source: Gorove/Slade Associates, Inc.

Date of Counts: Thursday, March 13, 2014

Intersection: **Kenilworth Avenue/Edmonston Road (MD 201) & Cherrywood Lane (Signalized)**

AM PEAK			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Kennilworth Avenue**				**No Approach**				**Kennilworth Avenue**				**Cherrywood Lane**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	44	127	0	0	0	0	0	0	0	222	36	0	7	0	21	0
6:45 AM	to	7:00 AM	44	88	9	7	0	0	0	0	0	159	16	0	12	0	13	0
7:00 AM	to	7:15 AM	51	92	0	14	0	0	0	0	0	194	30	0	11	0	24	0
7:15 AM	to	7:30 AM	46	98	0	0	0	0	0	0	0	183	23	0	6	0	20	0
7:30 AM	to	7:45 AM	56	134	0	8	0	0	0	0	0	180	25	0	11	0	21	0
7:45 AM	to	8:00 AM	30	94	0	0	0	0	0	0	1	265	32	0	7	0	20	0
8:00 AM	to	8:15 AM	69	182	0	1	0	0	0	0	0	218	69	0	11	0	19	0
8:15 AM	to	8:30 AM	73	196	0	0	0	0	0	0	0	158	52	0	9	0	37	0
8:30 AM	to	8:45 AM	80	218	0	0	0	0	0	0	0	184	51	0	18	0	36	0
8:45 AM	to	9:00 AM	50	230	0	0	0	0	0	0	0	210	59	0	16	0	31	0
9:00 AM	to	9:15 AM	41	167	0	0	0	0	0	0	0	180	37	0	11	0	26	0
9:15 AM	to	9:30 AM	48	174	0	0	0	0	0	0	0	175	44	0	4	0	31	0

PM PEAK			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Kennilworth Avenue**				**No Approach**				**Kennilworth Avenue**				**Cherrywood Lane**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	31	244	0	0	0	0	0	0	0	132	39	0	29	0	40	0
4:15 PM	to	4:30 PM	45	274	0	1	0	0	0	0	0	151	57	0	36	1	46	0
4:30 PM	to	4:45 PM	24	241	0	0	0	0	0	0	0	118	26	0	40	0	52	0
4:45 PM	to	5:00 PM	36	219	0	0	0	0	0	0	0	88	12	0	43	0	39	0
5:00 PM	to	5:15 PM	36	228	0	0	0	0	0	0	0	142	42	0	57	0	65	0
5:15 PM	to	5:30 PM	33	210	0	0	0	0	0	0	0	88	32	0	64	0	87	0
5:30 PM	to	5:45 PM	42	168	0	0	0	0	0	0	0	113	44	0	27	0	45	0
5:45 PM	to	6:00 PM	35	194	0	0	0	0	0	0	0	121	34	0	49	0	48	0
6:00 PM	to	6:15 PM	24	165	0	0	0	0	0	0	0	107	22	0	44	0	55	0
6:15 PM	to	6:30 PM	24	181	0	0	0	0	0	0	0	63	11	0	47	0	52	0
6:30 PM	to	6:45 PM	43	197	0	0	0	0	0	0	0	123	37	0	42	0	57	0
6:45 PM	to	7:00 PM	21	182	0	0	0	0	0	0	0	196	77	0	47	0	47	0

PEAK HOURS			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Kennilworth Avenue**				**No Approach**				**Kennilworth Avenue**				**Cherrywood Lane**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
8:00 AM	to	9:00 AM	272	826	0	1	0	0	0	0	0	770	231	0	54	0	123	0
PM INTERSECTION PEAK HOUR																		
4:15 PM	to	5:15 PM	141	962	0	1	0	0	0	0	0	499	137	0	176	1	202	0
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	252	690	0	1	0	0	0	0	1	825	204	0	45	0	112	0
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	129	898	0	0	0	0	0	0	0	436	112	0	204	0	243	0

PEAK HOUR FACTORS	Southbound				Westbound				Northbound				Eastbound			
	Kennilworth Avenue				**No Approach**				**Kennilworth Avenue**				**Cherrywood Lane**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.79	0.79	0.00	**0.79**	0.00	0.00	0.00	**#DIV/0!**	0.25	0.78	0.74	**0.86**	0.63	0.00	0.76	**0.73**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.90	0.93	0.00	**0.97**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.77	0.67	**0.74**	0.80	0.00	0.70	**0.74**

Overall AM PEAK HOUR FACTOR = **0.91** **Overall PM PEAK HOUR FACTOR** = **0.89**

AM Period Intersection Volume: 5666 **PM Period Intersection Volume:** 5931

Gorove/Slade Associates

Project Name : Louis Berger
Project # : 2079-013
Location Greenbelt, MD
Data Source: Gorove/Slade Associates, Inc.

Date of Counts: Thursday, April 3, 2014

Intersection: **Edmonston Road (MD 201) & Sunnyside Avenue (Signalized)**

AM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Edmonston Road**				**Farm Driveway**				**Edmonston Road**				**Sunnyside Avenue**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	53	193	0	0	0	0	0	0	0	165	65	0	36	0	14	0
6:45 AM	to	7:00 AM	50	208	0	0	0	0	0	0	0	202	80	0	31	0	10	0
7:00 AM	to	7:15 AM	45	255	0	0	0	0	0	0	0	161	74	0	49	0	12	0
7:15 AM	to	7:30 AM	39	227	0	0	0	0	0	0	1	199	80	0	69	0	23	0
7:30 AM	to	7:45 AM	34	250	0	0	0	0	0	0	0	216	77	0	78	0	26	0
7:45 AM	to	8:00 AM	67	253	0	0	0	0	0	0	0	234	64	0	65	0	25	0
8:00 AM	to	8:15 AM	42	247	0	0	0	0	0	0	0	178	71	0	76	0	22	0
8:15 AM	to	8:30 AM	38	244	0	0	0	0	0	0	1	192	70	0	91	0	40	0
8:30 AM	to	8:45 AM	53	219	0	0	0	0	0	0	0	196	69	0	89	0	25	0
8:45 AM	to	9:00 AM	58	215	0	0	0	0	0	0	0	163	65	0	72	0	30	0
9:00 AM	to	9:15 AM	47	186	0	0	0	0	0	0	0	147	72	0	42	0	12	0
9:15 AM	to	9:30 AM	42	165	0	0	0	0	0	0	0	140	63	0	65	0	22	0

PM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Edmonston Road**				**Farm Driveway**				**Edmonston Road**				**Sunnyside Avenue**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	37	187	0	0	0	0	0	0	0	207	66	0	101	0	56	0
4:15 PM	to	4:30 PM	45	201	0	0	0	0	0	0	0	259	66	0	106	0	60	0
4:30 PM	to	4:45 PM	41	199	0	0	0	0	0	0	0	261	55	0	109	0	73	0
4:45 PM	to	5:00 PM	42	219	0	0	0	0	0	0	0	249	55	0	115	0	66	0
5:00 PM	to	5:15 PM	32	223	0	0	0	0	0	0	0	221	73	0	132	0	64	0
5:15 PM	to	5:30 PM	56	238	0	0	0	0	0	0	0	258	78	0	118	0	57	0
5:30 PM	to	5:45 PM	45	216	0	0	0	0	0	0	0	268	77	0	122	0	70	0
5:45 PM	to	6:00 PM	37	231	0	0	0	0	0	0	0	270	78	0	101	0	58	0
6:00 PM	to	6:15 PM	35	168	0	0	0	0	0	0	0	229	94	0	102	0	48	0
6:15 PM	to	6:30 PM	36	173	0	0	0	0	0	0	0	225	54	0	70	0	58	0
6:30 PM	to	6:45 PM	25	162	0	0	0	0	0	0	0	196	49	0	75	0	31	0
6:45 PM	to	7:00 PM	24	139	0	0	0	0	0	0	0	203	59	0	48	0	26	0

PEAK HOURS

			Southbound				Westbound				Northbound				Eastbound			
Direction:			Southbound				Westbound				Northbound				Eastbound			
Roadway:			**Edmonston Road**				**Farm Driveway**				**Edmonston Road**				**Sunnyside Avenue**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:30 AM	to	8:30 AM	181	994	0	0	0	0	0	0	1	820	282	0	310	0	113	0
PM INTERSECTION PEAK HOUR																		
5:00 PM	to	6:00 PM	170	908	0	0	0	0	0	0	0	1017	306	0	473	0	249	0
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	200	963	0	0	0	0	0	0	1	800	274	0	321	0	112	0
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	171	879	0	0	0	0	0	0	0	989	261	0	474	0	260	0

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	Edmonston Road				**Farm Driveway**				**Edmonston Road**				**Sunnyside Avenue**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.75	0.95	0.00	**0.91**	0.00	0.00	0.00	**#DIV/0!**	0.25	0.85	0.96	**0.90**	0.88	0.00	0.70	**0.83**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.76	0.92	0.00	**0.89**	0.00	0.00	0.00	**#DIV/0!**	0.00	0.95	0.84	**0.93**	0.90	0.00	0.89	**0.94**

Overall AM PEAK HOUR FACTOR = **0.94**

Overall PM PEAK HOUR FACTOR = **0.94**

AM Period Intersection Volume: 7299

PM Period Intersection Volume: 8327

Gorove/Slade Associates

Project # : Louis Berger
2079-013
Location Greenbelt, MD
Data Source: Gorove/Slade Associates, Inc.

Date of Counts: Thursday, April 3, 2014

Intersection: **Edmonston Road (MD201) at Powder Mill Road (Signalized)**

AM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:			**Edmonston Road**				**Powder Mill Road**				**Edmonston Road**				**Powdermill Road**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
6:30 AM	to	6:45 AM	11	117	3	0	4	41	58	0	8	142	111	0	95	36	2	0
6:45 AM	to	7:00 AM	13	129	5	0	7	46	55	0	11	178	119	0	86	40	3	0
7:00 AM	to	7:15 AM	16	176	4	0	14	47	50	0	7	144	105	0	115	21	3	0
7:15 AM	to	7:30 AM	13	158	9	0	8	39	41	0	15	165	97	0	123	34	7	0
7:30 AM	to	7:45 AM	16	129	12	0	10	58	32	0	17	140	120	0	117	60	14	0
7:45 AM	to	8:00 AM	32	160	10	2	8	62	35	0	4	210	171	0	107	48	16	0
8:00 AM	to	8:15 AM	10	149	7	0	6	55	41	0	14	149	111	0	108	73	11	0
8:15 AM	to	8:30 AM	7	137	6	0	9	56	34	0	27	142	154	0	133	71	15	3
8:30 AM	to	8:45 AM	13	145	9	0	9	45	27	0	22	129	145	0	118	69	13	0
8:45 AM	to	9:00 AM	8	104	3	0	7	39	27	0	21	101	159	0	63	25	9	0
9:00 AM	to	9:15 AM	16	116	3	0	5	35	28	0	13	114	140	0	105	37	10	0
9:15 AM	to	9:30 AM	14	108	2	0	3	31	24	0	10	77	100	0	98	16	6	1

PM PEAK

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:			**Edmonston Road**				**Powder Mill Road**				**Edmonston Road**				**Powdermill Road**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
4:00 PM	to	4:15 PM	6	144	17	0	7	43	19	0	48	175	148	0	114	47	11	0
4:15 PM	to	4:30 PM	8	138	16	0	6	33	20	0	53	248	141	0	93	73	38	0
4:30 PM	to	4:45 PM	8	106	17	0	4	45	27	0	62	199	144	0	66	93	28	0
4:45 PM	to	5:00 PM	14	154	17	0	5	34	20	0	68	199	112	0	100	79	12	0
5:00 PM	to	5:15 PM	6	145	22	0	8	35	24	0	57	145	144	0	92	121	20	0
5:15 PM	to	5:30 PM	11	146	11	0	11	42	17	0	56	173	117	0	112	93	29	0
5:30 PM	to	5:45 PM	10	145	14	0	1	33	32	0	48	200	170	0	106	105	25	0
5:45 PM	to	6:00 PM	3	112	8	0	4	36	35	0	55	171	107	0	100	85	27	0
6:00 PM	to	6:15 PM	10	101	7	0	6	18	17	0	49	151	97	0	92	105	32	0
6:15 PM	to	6:30 PM	5	98	9	0	15	28	17	0	43	213	122	0	105	73	20	0
6:30 PM	to	6:45 PM	8	73	4	0	3	20	9	0	27	145	108	0	99	77	42	0
6:45 PM	to	7:00 PM	12	66	6	0	4	42	19	0	36	137	81	0	67	60	29	0

PEAK HOURS

			Southbound				Westbound				Northbound				Eastbound			
Direction:																		
Roadway:			**Edmonston Road**				**Powder Mill Road**				**Edmonston Road**				**Powdermill Road**			
Movement:			Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds
AM INTERSECTION PEAK HOUR																		
7:45 AM	to	8:45 AM	62	591	32	2	32	218	137	0	67	630	581	0	466	261	55	3
PM INTERSECTION PEAK HOUR																		
4:45 PM	to	5:45 PM	41	590	64	0	25	144	93	0	229	717	543	0	410	398	86	0
AM SYSTEM PEAK HOUR																		
7:45 AM	to	8:45 AM	62	591	32	2	32	218	137	0	67	630	581	0	466	261	55	3
PM SYSTEM PEAK HOUR																		
4:30 PM	to	5:30 PM	39	551	67	0	28	156	88	0	243	716	517	0	370	386	89	0

PEAK HOUR FACTORS

	Southbound				Westbound				Northbound				Eastbound			
	Edmonston Road				**Powder Mill Road**				**Edmonston Road**				**Powdermill Road**			
AM Peak Hour	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
AM PEAK HOUR	0.48	0.92	0.80	**0.85**	0.89	0.88	0.84	**0.92**	0.62	0.75	0.85	**0.83**	0.88	0.89	0.86	**0.89**
	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach	Right	Thru	Left	Approach
PM PEAK HOUR	0.70	0.89	0.76	**0.89**	0.64	0.87	0.81	**0.89**	0.89	0.90	0.90	**0.91**	0.83	0.80	0.77	**0.90**

Overall AM PEAK HOUR FACTOR = **0.91** **Overall PM PEAK HOUR FACTOR** = **0.99**

AM Period Intersection Volume: 8265 **PM Period Intersection Volume:** 9135

QUALITY COUNTS REPORT
==========

Type: Volume Data
Location: SB I-95/495 On-Ramp from US Route 1
Specific Lo 0 ft from
City/State: Beltsville MD
QCJobNo: 13171514
Direction: SB
Comments:

'==========:

Start Time	Mon	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
				15-Jan-15					
12:00 AM				52		52			52
1:00 AM				62		62			62
2:00 AM				120		120			120
3:00 AM				370		370			370
4:00 AM				673		673			673
5:00 AM				1050		1050			1050
6:00 AM				1121		1121			1121
7:00 AM				825		825			825
8:00 AM				678		678			678
9:00 AM				646		646			646
10:00 AM				783		783			783
11:00 AM				824		824			824
12:00 PM				837		837			837
1:00 PM				934		934			934
2:00 PM				1105		1105			1105
3:00 PM				1136		1136			1136
4:00 PM				880		880			880
5:00 PM				688		688			688
6:00 PM				555		555			555
7:00 PM				480		480			480
8:00 PM				339		339			339
9:00 PM				187		187			187
10:00 PM				108		108			108
11:00 PM				75		75			75
Day Total				14528		14528			14528
ADT				14528		14528			14528
%Weekday Average				100.00%					
%Week Average				100.00%		100.00%			
AM Peak				6:00 AM		6:00 AM			6:00 AM
Volume				1121		1121			1121
PM Peak				3:00 PM		3:00 PM			3:00 PM
Volume				1136		1136			1136

QUALITY COUNTS REPORT
==========

Type: Volume Data
Location: NB I-95/495 Off-Ramp to NB US Route 1
Specific Lo 0 ft from
City/State: Beltsville MD
QCJobNo: 13171513
Direction: NB
Comments:

'==========:

Start Time	Mon	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
				15-Jan-15					
12:00 AM				113		113			113
1:00 AM				63		63			63
2:00 AM				50		50			50
3:00 AM				84		84			84
4:00 AM				88		88			88
5:00 AM				270		270			270
6:00 AM				603		603			603
7:00 AM				991		991			991
8:00 AM				911		911			911
9:00 AM				829		829			829
10:00 AM				650		650			650
11:00 AM				749		749			749
12:00 PM				815		815			815
1:00 PM				741		741			741
2:00 PM				786		786			786
3:00 PM				867		867			867
4:00 PM				828		828			828
5:00 PM				769		769			769
6:00 PM				841		841			841
7:00 PM				649		649			649
8:00 PM				471		471			471
9:00 PM				404		404			404
10:00 PM				293		293			293
11:00 PM				226		226			226
Day Total				13091		13091			13091
ADT				13091		13091			13091
%Weekday Average				100.00%					
%Week Average				100.00%		100.00%			
AM Peak				7:00 AM		7:00 AM			7:00 AM
Volume				991		991			991
PM Peak				3:00 PM		3:00 PM			3:00 PM
Volume				867		867			867

QUALITY COUNTS REPORT
==========

Type: Volume Data
Location: Greenbelt Metro Station btwn last parking lot and I-95 Ramp
Specific Lo 0 ft from
City/State: Greenbelt MD
QCJobNo: 13132712
Direction: WB
Comments:

'==========:

Start Time	Mon	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
			5-Nov-14	6-Nov-14					
12:00 AM			92	60		76			76
1:00 AM			34	64		49			49
2:00 AM			2	10		6			6
3:00 AM			0	1		1			1
4:00 AM			0	1		1			1
5:00 AM			4	2		3			3
6:00 AM			9	18		14			14
7:00 AM			38	41		40			40
8:00 AM			68	65		67			67
9:00 AM			52	48		50			50
10:00 AM			39	37		38			38
11:00 AM			43	35		39			39
12:00 PM			32	50		41			41
1:00 PM			53	71		62			62
2:00 PM			57	73		65			65
3:00 PM			79	98		89			89
4:00 PM			176	162		169			169
5:00 PM			289	258		274			274
6:00 PM			451	539		495			495
7:00 PM			442	379		411			411
8:00 PM			205	178		192			192
9:00 PM			101	108		105			105
10:00 PM			88	88		88			88
11:00 PM			62	66		64			64
Day Total			2416	2452		2439			2439
ADT			2416	2452		2439			2439
%Weekday Average			99.10%	100.50%					
%Week Average			99.10%	100.50%		100.00%			
AM Peak			12:00 AM	8:00 AM		12:00 AM			12:00 AM
Volume			92	65		76			76
PM Peak			6:00 PM	6:00 PM		6:00 PM			6:00 PM
Volume			451	539		495			495

QUALITY COUNTS REPORT
==========

Type: Volume Data
Location: Greenbelt Metro just South of Train Station
Specific Lo 0 ft from
City/State: Greenbelt MD
QCJobNo: 13132711
Direction: SB
Comments:

'==========:

Start Time	Mon	Tue	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
			5-Nov-14	6-Nov-14					
12:00 AM			17	15		16			16
1:00 AM			8	13		11			11
2:00 AM			2	4		3			3
3:00 AM			0	1		1			1
4:00 AM			2	2		2			2
5:00 AM			44	35		40			40
6:00 AM			134	145		140			140
7:00 AM			335	370		353			353
8:00 AM			402	436		419			419
9:00 AM			337	366		352			352
10:00 AM			201	151		176			176
11:00 AM			95	86		91			91
12:00 PM			57	56		57			57
1:00 PM			43	71		57			57
2:00 PM			35	52		44			44
3:00 PM			45	51		48			48
4:00 PM			69	48		59			59
5:00 PM			68	58		63			63
6:00 PM			79	93		86			86
7:00 PM			95	99		97			97
8:00 PM			63	50		57			57
9:00 PM			35	31		33			33
10:00 PM			32	34		33			33
11:00 PM			27	26		27			27
Day Total			2225	2293		2265			2265
ADT			2225	2293		2265			2265
%Weekday Average			98.20%	101.20%					
%Week Average			98.20%	101.20%		100.00%			
AM Peak			8:00 AM	8:00 AM		8:00 AM			8:00 AM
Volume			402	436		419			419
PM Peak			7:00 PM	7:00 PM		7:00 PM			7:00 PM
Volume			95	99		97			97

QUALITY COUNTS REPORT
====================

Intersection: NB I-95/495 Mainline Btwn Greenbelt Station & Kenilworth Ave
Date: 1/15/2015
City/State: Greenbelt MD
QCJobNo: 13171529
ClientID:
Comments:

PEAK HOUR START 3:30 PM
PEAK HOUR END 4:30 PM
PEAK 15-MIN START 4:00 PM
PEAK 15-MIN END 4:15 PM
PHF 0.97

Lane Configuration:

	SBLane1	SBLane2	SBLane3	SBLane4	SBLane5	SBLane6	SBLane7	
EBLane7								WBLane1
EBLane6								WBLane2
EBLane5								WBLane3
EBLane4								WBLane4
EBLane3								WBLane5
EBLane2								WBLane6
EBLane1								WBLane7
			T	T	T	T	T	
	NBLane7	NBLane6	NBLane5	NBLane4	NBLane3	NBLane2	NBLane1	

PEAK-HOUR VOLUMES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEntering	NBLeaving	SBLeaving	EBLeaving	WBLeaving
0	7819	0	0	0	0	0	0	0	0	0	0	7819	0	0	0	7819	0	0	0

PERCENT HEAVY VEHICLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEntering	SBEntering	EBEntering	WBEntering	NBLeaving	SBLeaving	EBLeaving	WBLeaving
0	5.2	0	0	0	0	0	0	0	0	0	0	5.2	0	0	0	5.2	0	0	0

PEAK-HOUR VOLUMES - PEDESTRIANS

North	South	East	West
0	0	0	0

PEAK-HOUR VOLUMES - BICYCLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight
0	0	0	0	0	0	0	0	0	0	0	0

PEAK 15-MIN FLOWRATES

VehicleType	NBLeft	NBThru	NBRight	NBUTurn	NBRTOR	SBLeft	SBThru	SBRight	SBUTurn	SBRTOR	EBLeft	EBThru	EBRight	EBUTurn	EBRTOR	WBLeft	WBThru	WBRight	WBUTurn	WBRTOR	Total
All Vehicles	0	8028	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8028
Heavy Trucks	0	408	0			0	0	0			0	0	0			0	0	0			408
Pedestrians		0					0					0					0				0
Bicycles	0	0	0			0	0	0			0	0	0			0	0	0			0

ALL-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
12:00 AM	0	283	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	283	
12:15 AM	0	231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	231	
12:30 AM	0	197	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	197	
12:45 AM	0	169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	169	880
1:00 AM	0	132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	132	729
1:15 AM	0	128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128	626
1:30 AM	0	128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128	557
1:45 AM	0	137	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137	525
2:00 AM	0	129	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	129	522
2:15 AM	0	140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	140	534
2:30 AM	0	135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	135	541
2:45 AM	0	136	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136	540
3:00 AM	0	122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	122	533
3:15 AM	0	147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	147	540
3:30 AM	0	202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	202	607
3:45 AM	0	201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	201	672

QUALITY COUNTS REPORT

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Intersection: NB I-95/495 Mainline Btwn Greenbelt Station & Kenilworth Ave

Date: 1/15/2015

ALL-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
4:00 AM	0	271	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	271	821
4:15 AM	0	292	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	292	966
4:30 AM	0	442	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	442	1206
4:45 AM	0	471	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	471	1476
5:00 AM	0	690	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	690	1895
5:15 AM	0	1015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1015	2618
5:30 AM	0	1251	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1251	3427
5:45 AM	0	1347	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1347	4303
6:00 AM	0	1583	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1583	5196
6:15 AM	0	1588	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1588	5769
6:30 AM	0	1337	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1337	5855
6:45 AM	0	1316	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1316	5824
7:00 AM	0	1729	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1729	5970
7:15 AM	0	1843	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1843	6225
7:30 AM	0	1771	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1771	6659
7:45 AM	0	1543	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1543	6886
8:00 AM	0	1859	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1859	7016
8:15 AM	0	1880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1880	7053
8:30 AM	0	1773	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1773	7055
8:45 AM	0	1419	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1419	6931
9:00 AM	0	1590	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1590	6662
9:15 AM	0	1687	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1687	6469
9:30 AM	0	1377	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1377	6073
9:45 AM	0	1467	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1467	6121
10:00 AM	0	1152	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1152	5683
10:15 AM	0	1150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1150	5146
10:30 AM	0	1267	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1267	5036
10:45 AM	0	1216	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1216	4785
11:00 AM	0	1216	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1216	4849
11:15 AM	0	1310	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1310	5009
11:30 AM	0	1317	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1317	5059
11:45 AM	0	1283	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1283	5126
12:00 PM	0	1323	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1323	5233
12:15 PM	0	1296	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1296	5219
12:30 PM	0	1236	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1236	5138
12:45 PM	0	1322	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1322	5177
1:00 PM	0	1289	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1289	5143
1:15 PM	0	1260	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1260	5107
1:30 PM	0	1344	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1344	5215
1:45 PM	0	1365	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1365	5258
2:00 PM	0	1541	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1541	5510
2:15 PM	0	1714	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1714	5964
2:30 PM	0	1715	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1715	6335
2:45 PM	0	1773	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1773	6743
3:00 PM	0	1764	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1764	6966
3:15 PM	0	1894	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1894	7146
3:30 PM	0	1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1969	7400
3:45 PM	0	1910	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1910	7537
4:00 PM	0	2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2007	7780
4:15 PM	0	1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1933	7819
4:30 PM	0	1891	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1891	7741
4:45 PM	0	1762	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1762	7593
5:00 PM	0	1724	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1724	7310
5:15 PM	0	1813	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1813	7190
5:30 PM	0	1710	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1710	7009

QUALITY COUNTS REPORT
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Intersection: NB I-95/495 Mainline Btwn Greenbelt Station & Kenilworth Ave
Date: 1/15/2015
ALL-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
5:45 PM	0	1671	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1671	6918
6:00 PM	0	1566	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1566	6760
6:15 PM	0	1632	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1632	6579
6:30 PM	0	1409	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1409	6278
6:45 PM	0	1611	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1611	6218
7:00 PM	0	1330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1330	5982
7:15 PM	0	1237	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1237	5587
7:30 PM	0	1200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1200	5378
7:45 PM	0	1023	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1023	4790
8:00 PM	0	992	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	992	4452
8:15 PM	0	964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	964	4179
8:30 PM	0	880	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	880	3859
8:45 PM	0	789	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	789	3625
9:00 PM	0	755	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	755	3388
9:15 PM	0	748	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	748	3172
9:30 PM	0	745	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	745	3037
9:45 PM	0	722	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	722	2970
10:00 PM	0	655	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	655	2870
10:15 PM	0	618	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	618	2740
10:30 PM	0	635	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	635	2630
10:45 PM	0	499	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	499	2407
11:00 PM	0	388	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	388	2140
11:15 PM	0	374	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	374	1896
11:30 PM	0	359	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	359	1620
11:45 PM	0	290	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	290	1411

HEAVY-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
12:00 AM	0	50	0	0	0	0	0	0	0	0	0	0	50
12:15 AM	0	28	0	0	0	0	0	0	0	0	0	0	28
12:30 AM	0	37	0	0	0	0	0	0	0	0	0	0	37
12:45 AM	0	35	0	0	0	0	0	0	0	0	0	0	35
1:00 AM	0	31	0	0	0	0	0	0	0	0	0	0	31
1:15 AM	0	29	0	0	0	0	0	0	0	0	0	0	29
1:30 AM	0	32	0	0	0	0	0	0	0	0	0	0	32
1:45 AM	0	39	0	0	0	0	0	0	0	0	0	0	39
2:00 AM	0	43	0	0	0	0	0	0	0	0	0	0	43
2:15 AM	0	42	0	0	0	0	0	0	0	0	0	0	42
2:30 AM	0	45	0	0	0	0	0	0	0	0	0	0	45
2:45 AM	0	47	0	0	0	0	0	0	0	0	0	0	47
3:00 AM	0	39	0	0	0	0	0	0	0	0	0	0	39
3:15 AM	0	43	0	0	0	0	0	0	0	0	0	0	43
3:30 AM	0	58	0	0	0	0	0	0	0	0	0	0	58
3:45 AM	0	43	0	0	0	0	0	0	0	0	0	0	43
4:00 AM	0	57	0	0	0	0	0	0	0	0	0	0	57
4:15 AM	0	66	0	0	0	0	0	0	0	0	0	0	66
4:30 AM	0	77	0	0	0	0	0	0	0	0	0	0	77
4:45 AM	0	80	0	0	0	0	0	0	0	0	0	0	80
5:00 AM	0	89	0	0	0	0	0	0	0	0	0	0	89
5:15 AM	0	105	0	0	0	0	0	0	0	0	0	0	105
5:30 AM	0	109	0	0	0	0	0	0	0	0	0	0	109
5:45 AM	0	95	0	0	0	0	0	0	0	0	0	0	95
6:00 AM	0	96	0	0	0	0	0	0	0	0	0	0	96
6:15 AM	0	78	0	0	0	0	0	0	0	0	0	0	78
6:30 AM	0	63	0	0	0	0	0	0	0	0	0	0	63

QUALITY COUNTS REPORT

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Intersection: NB I-95/495 Mainline Btwn Greenbelt Station & Kenilworth Ave

Date: 1/15/2015

HEAVY-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
6:45 AM	0	53	0	0	0	0	0	0	0	0	0	0	53
7:00 AM	0	125	0	0	0	0	0	0	0	0	0	0	125
7:15 AM	0	132	0	0	0	0	0	0	0	0	0	0	132
7:30 AM	0	121	0	0	0	0	0	0	0	0	0	0	121
7:45 AM	0	112	0	0	0	0	0	0	0	0	0	0	112
8:00 AM	0	126	0	0	0	0	0	0	0	0	0	0	126
8:15 AM	0	125	0	0	0	0	0	0	0	0	0	0	125
8:30 AM	0	153	0	0	0	0	0	0	0	0	0	0	153
8:45 AM	0	110	0	0	0	0	0	0	0	0	0	0	110
9:00 AM	0	192	0	0	0	0	0	0	0	0	0	0	192
9:15 AM	0	193	0	0	0	0	0	0	0	0	0	0	193
9:30 AM	0	160	0	0	0	0	0	0	0	0	0	0	160
9:45 AM	0	84	0	0	0	0	0	0	0	0	0	0	84
10:00 AM	0	170	0	0	0	0	0	0	0	0	0	0	170
10:15 AM	0	167	0	0	0	0	0	0	0	0	0	0	167
10:30 AM	0	190	0	0	0	0	0	0	0	0	0	0	190
10:45 AM	0	174	0	0	0	0	0	0	0	0	0	0	174
11:00 AM	0	199	0	0	0	0	0	0	0	0	0	0	199
11:15 AM	0	191	0	0	0	0	0	0	0	0	0	0	191
11:30 AM	0	182	0	0	0	0	0	0	0	0	0	0	182
11:45 AM	0	188	0	0	0	0	0	0	0	0	0	0	188
12:00 PM	0	166	0	0	0	0	0	0	0	0	0	0	166
12:15 PM	0	152	0	0	0	0	0	0	0	0	0	0	152
12:30 PM	0	150	0	0	0	0	0	0	0	0	0	0	150
12:45 PM	0	166	0	0	0	0	0	0	0	0	0	0	166
1:00 PM	0	159	0	0	0	0	0	0	0	0	0	0	159
1:15 PM	0	161	0	0	0	0	0	0	0	0	0	0	161
1:30 PM	0	156	0	0	0	0	0	0	0	0	0	0	156
1:45 PM	0	187	0	0	0	0	0	0	0	0	0	0	187
2:00 PM	0	163	0	0	0	0	0	0	0	0	0	0	163
2:15 PM	0	163	0	0	0	0	0	0	0	0	0	0	163
2:30 PM	0	173	0	0	0	0	0	0	0	0	0	0	173
2:45 PM	0	147	0	0	0	0	0	0	0	0	0	0	147
3:00 PM	0	103	0	0	0	0	0	0	0	0	0	0	103
3:15 PM	0	119	0	0	0	0	0	0	0	0	0	0	119
3:30 PM	0	112	0	0	0	0	0	0	0	0	0	0	112
3:45 PM	0	98	0	0	0	0	0	0	0	0	0	0	98
4:00 PM	0	102	0	0	0	0	0	0	0	0	0	0	102
4:15 PM	0	98	0	0	0	0	0	0	0	0	0	0	98
4:30 PM	0	94	0	0	0	0	0	0	0	0	0	0	94
4:45 PM	0	69	0	0	0	0	0	0	0	0	0	0	69
5:00 PM	0	73	0	0	0	0	0	0	0	0	0	0	73
5:15 PM	0	59	0	0	0	0	0	0	0	0	0	0	59
5:30 PM	0	65	0	0	0	0	0	0	0	0	0	0	65
5:45 PM	0	58	0	0	0	0	0	0	0	0	0	0	58
6:00 PM	0	70	0	0	0	0	0	0	0	0	0	0	70
6:15 PM	0	70	0	0	0	0	0	0	0	0	0	0	70
6:30 PM	0	63	0	0	0	0	0	0	0	0	0	0	63
6:45 PM	0	68	0	0	0	0	0	0	0	0	0	0	68
7:00 PM	0	56	0	0	0	0	0	0	0	0	0	0	56
7:15 PM	0	78	0	0	0	0	0	0	0	0	0	0	78
7:30 PM	0	57	0	0	0	0	0	0	0	0	0	0	57
7:45 PM	0	56	0	0	0	0	0	0	0	0	0	0	56
8:00 PM	0	50	0	0	0	0	0	0	0	0	0	0	50
8:15 PM	0	70	0	0	0	0	0	0	0	0	0	0	70
8:30 PM	0	61	0	0	0	0	0	0	0	0	0	0	61

QUALITY COUNTS REPORT

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Intersection: NB I-95/495 Mainline Btwn Greenbelt Station & Kenilworth Ave

Date: 1/15/2015

HEAVY-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
8:45 PM	0	42	0	0	0	0	0	0	0	0	0	0	42
9:00 PM	0	43	0	0	0	0	0	0	0	0	0	0	43
9:15 PM	0	45	0	0	0	0	0	0	0	0	0	0	45
9:30 PM	0	40	0	0	0	0	0	0	0	0	0	0	40
9:45 PM	0	40	0	0	0	0	0	0	0	0	0	0	40
10:00 PM	0	49	0	0	0	0	0	0	0	0	0	0	49
10:15 PM	0	40	0	0	0	0	0	0	0	0	0	0	40
10:30 PM	0	52	0	0	0	0	0	0	0	0	0	0	52
10:45 PM	0	38	0	0	0	0	0	0	0	0	0	0	38
11:00 PM	0	37	0	0	0	0	0	0	0	0	0	0	37
11:15 PM	0	26	0	0	0	0	0	0	0	0	0	0	26
11:30 PM	0	31	0	0	0	0	0	0	0	0	0	0	31
11:45 PM	0	30	0	0	0	0	0	0	0	0	0	0	30

QUALITY COUNTS REPORT
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Intersection:	SB I-95/495 Mainline Btwn Greenbelt Station & Kenilworth Ave		
Date:	1/15/2015		
City/State:	Greenbelt	MD	
QCJobNo:	13171530		
ClientID:			
Comments:			
PEAK HOUR START	7:45 AM		
PEAK HOUR END	8:45 AM		
PEAK 15-MIN START	8:15 AM		
PEAK 15-MIN END	8:30 AM		
PHF	0.99		

Lane Configuration:

	SBLane1	SBLane2	SBLane3	SBLane4	SBLane5	SBLane6	SBLane7
	T	T	T	T	T		

EBLane7	
EBLane6	
EBLane5	
EBLane4	
EBLane3	
EBLane2	
EBLane1	

WBLane1
WBLane2
WBLane3
WBLane4
WBLane5
WBLane6
WBLane7

	NBLane7	NBLane6	NBLane5	NBLane4	NBLane3	NBLane2	NBLane1

PEAK-HOUR VOLUMES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEnterin	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
0	0	0	0	7714	0	0	0	0	0	0	0	0	7714	0	0	0	7714	0	0

PERCENT HEAVY VEHICLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight	NBEnterin	SBEntering	EBEntering	WBEnterin	NBLeaving	SBLeaving	EBLeaving	WBLeaving
0	0	0	0	7.1	0	0	0	0	0	0	0	0	7.1	0	0	0	7.1	0	0

PEAK-HOUR VOLUMES - PEDESTRIANS

North	South	East	West
0	0	0	0

PEAK-HOUR VOLUMES - BICYCLES

NBLeft	NBThru	NBRight	SBLeft	SBThru	SBRight	EBLeft	EBThru	EBRight	WBLeft	WBThru	WBRight
0	0	0	0	0	0	0	0	0	0	0	0

PEAK 15-MIN FLOWRATES

VehicleType	NBLeft	NBThru	NBRight	NBUTurn	NBRTOR	SBLeft	SBThru	SBRight	SBUTurn	SBRTOR	EBLeft	EBThru	EBRight	EBUTurn	EBRTOR	WBLeft	WBThru	WBRight	WBUTurn	WBRTOR	Total
All Vehicles		0	0	0	0	0	7808	0	0	0	0	0	0	0	0	0	0	0	0	0	7808
Heavy Trucks		0	0	0		0	540	0			0	0	0			0	0	0			540
Pedestrians			0				0					0					0				0
Bicycles		0	0	0		0	0	0			0	0	0			0	0	0			0

ALL-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turr	WB RTOR	Total	Hourly Totals
12:00 AM		0	0	0	0	0	299	0	0	0	0	0	0	0	0	0	0	0	0	0	299	
12:15 AM		0	0	0	0	0	261	0	0	0	0	0	0	0	0	0	0	0	0	0	261	
12:30 AM		0	0	0	0	0	197	0	0	0	0	0	0	0	0	0	0	0	0	0	197	
12:45 AM		0	0	0	0	0	204	0	0	0	0	0	0	0	0	0	0	0	0	0	204	961
1:00 AM		0	0	0	0	0	155	0	0	0	0	0	0	0	0	0	0	0	0	0	155	817
1:15 AM		0	0	0	0	0	164	0	0	0	0	0	0	0	0	0	0	0	0	0	164	720
1:30 AM		0	0	0	0	0	135	0	0	0	0	0	0	0	0	0	0	0	0	0	135	658
1:45 AM		0	0	0	0	0	127	0	0	0	0	0	0	0	0	0	0	0	0	0	127	581
2:00 AM		0	0	0	0	0	119	0	0	0	0	0	0	0	0	0	0	0	0	0	119	545
2:15 AM		0	0	0	0	0	131	0	0	0	0	0	0	0	0	0	0	0	0	0	131	512
2:30 AM		0	0	0	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	0	160	537
2:45 AM		0	0	0	0	0	133	0	0	0	0	0	0	0	0	0	0	0	0	0	133	543

QUALITY COUNTS REPORT

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Intersection: SB I-95/495 Mainline Btwn Greenbelt Station & Kenilworth Ave

Date: 1/15/2015

ALL-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
3:00 AM	0	0	0	0	0	0	156	0	0	0	0	0	0	0	0	0	0	0	0	0	156	580
3:15 AM	0	0	0	0	0	0	164	0	0	0	0	0	0	0	0	0	0	0	0	0	164	613
3:30 AM	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	0	0	0	0	0	150	603
3:45 AM	0	0	0	0	0	0	162	0	0	0	0	0	0	0	0	0	0	0	0	0	162	632
4:00 AM	0	0	0	0	0	0	204	0	0	0	0	0	0	0	0	0	0	0	0	0	204	680
4:15 AM	0	0	0	0	0	0	232	0	0	0	0	0	0	0	0	0	0	0	0	0	232	748
4:30 AM	0	0	0	0	0	0	329	0	0	0	0	0	0	0	0	0	0	0	0	0	329	927
4:45 AM	0	0	0	0	0	0	375	0	0	0	0	0	0	0	0	0	0	0	0	0	375	1140
5:00 AM	0	0	0	0	0	0	565	0	0	0	0	0	0	0	0	0	0	0	0	0	565	1501
5:15 AM	0	0	0	0	0	0	858	0	0	0	0	0	0	0	0	0	0	0	0	0	858	2127
5:30 AM	0	0	0	0	0	0	1040	0	0	0	0	0	0	0	0	0	0	0	0	0	1040	2838
5:45 AM	0	0	0	0	0	0	1150	0	0	0	0	0	0	0	0	0	0	0	0	0	1150	3613
6:00 AM	0	0	0	0	0	0	1255	0	0	0	0	0	0	0	0	0	0	0	0	0	1255	4303
6:15 AM	0	0	0	0	0	0	1448	0	0	0	0	0	0	0	0	0	0	0	0	0	1448	4893
6:30 AM	0	0	0	0	0	0	1673	0	0	0	0	0	0	0	0	0	0	0	0	0	1673	5526
6:45 AM	0	0	0	0	0	0	1674	0	0	0	0	0	0	0	0	0	0	0	0	0	1674	6050
7:00 AM	0	0	0	0	0	0	1738	0	0	0	0	0	0	0	0	0	0	0	0	0	1738	6533
7:15 AM	0	0	0	0	0	0	1805	0	0	0	0	0	0	0	0	0	0	0	0	0	1805	6890
7:30 AM	0	0	0	0	0	0	1893	0	0	0	0	0	0	0	0	0	0	0	0	0	1893	7110
7:45 AM	0	0	0	0	0	0	1939	0	0	0	0	0	0	0	0	0	0	0	0	0	1939	7375
8:00 AM	0	0	0	0	0	0	1879	0	0	0	0	0	0	0	0	0	0	0	0	0	1879	7516
8:15 AM	0	0	0	0	0	0	1952	0	0	0	0	0	0	0	0	0	0	0	0	0	1952	7663
8:30 AM	0	0	0	0	0	0	1944	0	0	0	0	0	0	0	0	0	0	0	0	0	1944	7714
8:45 AM	0	0	0	0	0	0	1896	0	0	0	0	0	0	0	0	0	0	0	0	0	1896	7671
9:00 AM	0	0	0	0	0	0	1753	0	0	0	0	0	0	0	0	0	0	0	0	0	1753	7545
9:15 AM	0	0	0	0	0	0	1706	0	0	0	0	0	0	0	0	0	0	0	0	0	1706	7299
9:30 AM	0	0	0	0	0	0	1682	0	0	0	0	0	0	0	0	0	0	0	0	0	1682	7037
9:45 AM	0	0	0	0	0	0	1499	0	0	0	0	0	0	0	0	0	0	0	0	0	1499	6640
10:00 AM	0	0	0	0	0	0	1380	0	0	0	0	0	0	0	0	0	0	0	0	0	1380	6267
10:15 AM	0	0	0	0	0	0	1326	0	0	0	0	0	0	0	0	0	0	0	0	0	1326	5887
10:30 AM	0	0	0	0	0	0	1340	0	0	0	0	0	0	0	0	0	0	0	0	0	1340	5545
10:45 AM	0	0	0	0	0	0	1287	0	0	0	0	0	0	0	0	0	0	0	0	0	1287	5333
11:00 AM	0	0	0	0	0	0	1258	0	0	0	0	0	0	0	0	0	0	0	0	0	1258	5211
11:15 AM	0	0	0	0	0	0	1217	0	0	0	0	0	0	0	0	0	0	0	0	0	1217	5102
11:30 AM	0	0	0	0	0	0	1306	0	0	0	0	0	0	0	0	0	0	0	0	0	1306	5068
11:45 AM	0	0	0	0	0	0	1322	0	0	0	0	0	0	0	0	0	0	0	0	0	1322	5103
12:00 PM	0	0	0	0	0	0	1290	0	0	0	0	0	0	0	0	0	0	0	0	0	1290	5135
12:15 PM	0	0	0	0	0	0	1293	0	0	0	0	0	0	0	0	0	0	0	0	0	1293	5211
12:30 PM	0	0	0	0	0	0	1387	0	0	0	0	0	0	0	0	0	0	0	0	0	1387	5292
12:45 PM	0	0	0	0	0	0	1316	0	0	0	0	0	0	0	0	0	0	0	0	0	1316	5286
1:00 PM	0	0	0	0	0	0	1353	0	0	0	0	0	0	0	0	0	0	0	0	0	1353	5349
1:15 PM	0	0	0	0	0	0	1353	0	0	0	0	0	0	0	0	0	0	0	0	0	1353	5409
1:30 PM	0	0	0	0	0	0	1379	0	0	0	0	0	0	0	0	0	0	0	0	0	1379	5401
1:45 PM	0	0	0	0	0	0	1416	0	0	0	0	0	0	0	0	0	0	0	0	0	1416	5501
2:00 PM	0	0	0	0	0	0	1319	0	0	0	0	0	0	0	0	0	0	0	0	0	1319	5467
2:15 PM	0	0	0	0	0	0	1589	0	0	0	0	0	0	0	0	0	0	0	0	0	1589	5703
2:30 PM	0	0	0	0	0	0	1554	0	0	0	0	0	0	0	0	0	0	0	0	0	1554	5878
2:45 PM	0	0	0	0	0	0	1660	0	0	0	0	0	0	0	0	0	0	0	0	0	1660	6122

QUALITY COUNTS REPORT

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Intersection: SB I-95/495 Mainline Btwn Greenbelt Station & Kenilworth Ave

Date: 1/15/2015

ALL-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	NB U-Turn	NB RTOR	SB Left	SB Thru	SB Right	SB U-Turn	SB RTOR	EB Left	EB Thru	EB Right	EB U-Turn	EB RTOR	WB Left	WB Thru	WB Right	WB U-Turn	WB RTOR	Total	Hourly Totals
3:00 PM	0	0	0	0	0	0	1715	0	0	0	0	0	0	0	0	0	0	0	0	0	1715	6518
3:15 PM	0	0	0	0	0	0	1764	0	0	0	0	0	0	0	0	0	0	0	0	0	1764	6693
3:30 PM	0	0	0	0	0	0	1878	0	0	0	0	0	0	0	0	0	0	0	0	0	1878	7017
3:45 PM	0	0	0	0	0	0	1570	0	0	0	0	0	0	0	0	0	0	0	0	0	1570	6927
4:00 PM	0	0	0	0	0	0	1730	0	0	0	0	0	0	0	0	0	0	0	0	0	1730	6942
4:15 PM	0	0	0	0	0	0	1654	0	0	0	0	0	0	0	0	0	0	0	0	0	1654	6832
4:30 PM	0	0	0	0	0	0	1668	0	0	0	0	0	0	0	0	0	0	0	0	0	1668	6622
4:45 PM	0	0	0	0	0	0	1496	0	0	0	0	0	0	0	0	0	0	0	0	0	1496	6548
5:00 PM	0	0	0	0	0	0	1672	0	0	0	0	0	0	0	0	0	0	0	0	0	1672	6490
5:15 PM	0	0	0	0	0	0	1620	0	0	0	0	0	0	0	0	0	0	0	0	0	1620	6456
5:30 PM	0	0	0	0	0	0	1490	0	0	0	0	0	0	0	0	0	0	0	0	0	1490	6278
5:45 PM	0	0	0	0	0	0	1596	0	0	0	0	0	0	0	0	0	0	0	0	0	1596	6378
6:00 PM	0	0	0	0	0	0	1489	0	0	0	0	0	0	0	0	0	0	0	0	0	1489	6195
6:15 PM	0	0	0	0	0	0	1517	0	0	0	0	0	0	0	0	0	0	0	0	0	1517	6092
6:30 PM	0	0	0	0	0	0	1589	0	0	0	0	0	0	0	0	0	0	0	0	0	1589	6191
6:45 PM	0	0	0	0	0	0	1614	0	0	0	0	0	0	0	0	0	0	0	0	0	1614	6209
7:00 PM	0	0	0	0	0	0	1357	0	0	0	0	0	0	0	0	0	0	0	0	0	1357	6077
7:15 PM	0	0	0	0	0	0	1324	0	0	0	0	0	0	0	0	0	0	0	0	0	1324	5884
7:30 PM	0	0	0	0	0	0	1190	0	0	0	0	0	0	0	0	0	0	0	0	0	1190	5485
7:45 PM	0	0	0	0	0	0	1145	0	0	0	0	0	0	0	0	0	0	0	0	0	1145	5016
8:00 PM	0	0	0	0	0	0	1012	0	0	0	0	0	0	0	0	0	0	0	0	0	1012	4671
8:15 PM	0	0	0	0	0	0	983	0	0	0	0	0	0	0	0	0	0	0	0	0	983	4330
8:30 PM	0	0	0	0	0	0	973	0	0	0	0	0	0	0	0	0	0	0	0	0	973	4113
8:45 PM	0	0	0	0	0	0	854	0	0	0	0	0	0	0	0	0	0	0	0	0	854	3822
9:00 PM	0	0	0	0	0	0	886	0	0	0	0	0	0	0	0	0	0	0	0	0	886	3696
9:15 PM	0	0	0	0	0	0	893	0	0	0	0	0	0	0	0	0	0	0	0	0	893	3606
9:30 PM	0	0	0	0	0	0	879	0	0	0	0	0	0	0	0	0	0	0	0	0	879	3512
9:45 PM	0	0	0	0	0	0	751	0	0	0	0	0	0	0	0	0	0	0	0	0	751	3409
10:00 PM	0	0	0	0	0	0	703	0	0	0	0	0	0	0	0	0	0	0	0	0	703	3226
10:15 PM	0	0	0	0	0	0	749	0	0	0	0	0	0	0	0	0	0	0	0	0	749	3082
10:30 PM	0	0	0	0	0	0	630	0	0	0	0	0	0	0	0	0	0	0	0	0	630	2833
10:45 PM	0	0	0	0	0	0	591	0	0	0	0	0	0	0	0	0	0	0	0	0	591	2673
11:00 PM	0	0	0	0	0	0	435	0	0	0	0	0	0	0	0	0	0	0	0	0	435	2405
11:15 PM	0	0	0	0	0	0	519	0	0	0	0	0	0	0	0	0	0	0	0	0	519	2175
11:30 PM	0	0	0	0	0	0	425	0	0	0	0	0	0	0	0	0	0	0	0	0	425	1970
11:45 PM	0	0	0	0	0	0	363	0	0	0	0	0	0	0	0	0	0	0	0	0	363	1742

QUALITY COUNTS REPORT

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Intersection: SB I-95/495 Mainline Btwn Greenbelt Station & Kenilworth Ave

Date: 1/15/2015

HEAVY-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
12:00 AM	0	0	0	0	35	0	0	0	0	0	0	0	35
12:15 AM	0	0	0	0	31	0	0	0	0	0	0	0	31
12:30 AM	0	0	0	0	24	0	0	0	0	0	0	0	24
12:45 AM	0	0	0	0	42	0	0	0	0	0	0	0	42
1:00 AM	0	0	0	0	44	0	0	0	0	0	0	0	44
1:15 AM	0	0	0	0	36	0	0	0	0	0	0	0	36
1:30 AM	0	0	0	0	31	0	0	0	0	0	0	0	31
1:45 AM	0	0	0	0	42	0	0	0	0	0	0	0	42
2:00 AM	0	0	0	0	40	0	0	0	0	0	0	0	40
2:15 AM	0	0	0	0	31	0	0	0	0	0	0	0	31
2:30 AM	0	0	0	0	36	0	0	0	0	0	0	0	36
2:45 AM	0	0	0	0	33	0	0	0	0	0	0	0	33
3:00 AM	0	0	0	0	48	0	0	0	0	0	0	0	48
3:15 AM	0	0	0	0	62	0	0	0	0	0	0	0	62
3:30 AM	0	0	0	0	50	0	0	0	0	0	0	0	50
3:45 AM	0	0	0	0	57	0	0	0	0	0	0	0	57
4:00 AM	0	0	0	0	62	0	0	0	0	0	0	0	62
4:15 AM	0	0	0	0	47	0	0	0	0	0	0	0	47
4:30 AM	0	0	0	0	49	0	0	0	0	0	0	0	49
4:45 AM	0	0	0	0	26	0	0	0	0	0	0	0	26
5:00 AM	0	0	0	0	107	0	0	0	0	0	0	0	107
5:15 AM	0	0	0	0	131	0	0	0	0	0	0	0	131
5:30 AM	0	0	0	0	127	0	0	0	0	0	0	0	127
5:45 AM	0	0	0	0	127	0	0	0	0	0	0	0	127
6:00 AM	0	0	0	0	100	0	0	0	0	0	0	0	100
6:15 AM	0	0	0	0	111	0	0	0	0	0	0	0	111
6:30 AM	0	0	0	0	136	0	0	0	0	0	0	0	136
6:45 AM	0	0	0	0	137	0	0	0	0	0	0	0	137
7:00 AM	0	0	0	0	137	0	0	0	0	0	0	0	137
7:15 AM	0	0	0	0	137	0	0	0	0	0	0	0	137
7:30 AM	0	0	0	0	126	0	0	0	0	0	0	0	126
7:45 AM	0	0	0	0	127	0	0	0	0	0	0	0	127
8:00 AM	0	0	0	0	140	0	0	0	0	0	0	0	140
8:15 AM	0	0	0	0	135	0	0	0	0	0	0	0	135
8:30 AM	0	0	0	0	147	0	0	0	0	0	0	0	147
8:45 AM	0	0	0	0	129	0	0	0	0	0	0	0	129
9:00 AM	0	0	0	0	166	0	0	0	0	0	0	0	166
9:15 AM	0	0	0	0	152	0	0	0	0	0	0	0	152
9:30 AM	0	0	0	0	139	0	0	0	0	0	0	0	139
9:45 AM	0	0	0	0	169	0	0	0	0	0	0	0	169
10:00 AM	0	0	0	0	133	0	0	0	0	0	0	0	133
10:15 AM	0	0	0	0	142	0	0	0	0	0	0	0	142
10:30 AM	0	0	0	0	146	0	0	0	0	0	0	0	146
10:45 AM	0	0	0	0	152	0	0	0	0	0	0	0	152
11:00 AM	0	0	0	0	164	0	0	0	0	0	0	0	164
11:15 AM	0	0	0	0	151	0	0	0	0	0	0	0	151
11:30 AM	0	0	0	0	173	0	0	0	0	0	0	0	173
11:45 AM	0	0	0	0	148	0	0	0	0	0	0	0	148
12:00 PM	0	0	0	0	177	0	0	0	0	0	0	0	177

QUALITY COUNTS REPORT

==========

Intersection: SB I-95/495 Mainline Btwn Greenbelt Station & Kenilworth Ave

Date: 1/15/2015

HEAVY-VEHICLE VOLUMES

Time Period	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	Total
12:15 PM	0	0	0	0	174	0	0	0	0	0	0	0	174
12:30 PM	0	0	0	0	152	0	0	0	0	0	0	0	152
12:45 PM	0	0	0	0	169	0	0	0	0	0	0	0	169
1:00 PM	0	0	0	0	155	0	0	0	0	0	0	0	155
1:15 PM	0	0	0	0	121	0	0	0	0	0	0	0	121
1:30 PM	0	0	0	0	154	0	0	0	0	0	0	0	154
1:45 PM	0	0	0	0	148	0	0	0	0	0	0	0	148
2:00 PM	0	0	0	0	128	0	0	0	0	0	0	0	128
2:15 PM	0	0	0	0	142	0	0	0	0	0	0	0	142
2:30 PM	0	0	0	0	117	0	0	0	0	0	0	0	117
2:45 PM	0	0	0	0	99	0	0	0	0	0	0	0	99
3:00 PM	0	0	0	0	123	0	0	0	0	0	0	0	123
3:15 PM	0	0	0	0	137	0	0	0	0	0	0	0	137
3:30 PM	0	0	0	0	119	0	0	0	0	0	0	0	119
3:45 PM	0	0	0	0	94	0	0	0	0	0	0	0	94
4:00 PM	0	0	0	0	95	0	0	0	0	0	0	0	95
4:15 PM	0	0	0	0	64	0	0	0	0	0	0	0	64
4:30 PM	0	0	0	0	71	0	0	0	0	0	0	0	71
4:45 PM	0	0	0	0	71	0	0	0	0	0	0	0	71
5:00 PM	0	0	0	0	45	0	0	0	0	0	0	0	45
5:15 PM	0	0	0	0	51	0	0	0	0	0	0	0	51
5:30 PM	0	0	0	0	62	0	0	0	0	0	0	0	62
5:45 PM	0	0	0	0	48	0	0	0	0	0	0	0	48
6:00 PM	0	0	0	0	60	0	0	0	0	0	0	0	60
6:15 PM	0	0	0	0	71	0	0	0	0	0	0	0	71
6:30 PM	0	0	0	0	65	0	0	0	0	0	0	0	65
6:45 PM	0	0	0	0	74	0	0	0	0	0	0	0	74
7:00 PM	0	0	0	0	60	0	0	0	0	0	0	0	60
7:15 PM	0	0	0	0	53	0	0	0	0	0	0	0	53
7:30 PM	0	0	0	0	50	0	0	0	0	0	0	0	50
7:45 PM	0	0	0	0	66	0	0	0	0	0	0	0	66
8:00 PM	0	0	0	0	42	0	0	0	0	0	0	0	42
8:15 PM	0	0	0	0	35	0	0	0	0	0	0	0	35
8:30 PM	0	0	0	0	47	0	0	0	0	0	0	0	47
8:45 PM	0	0	0	0	40	0	0	0	0	0	0	0	40
9:00 PM	0	0	0	0	35	0	0	0	0	0	0	0	35
9:15 PM	0	0	0	0	46	0	0	0	0	0	0	0	46
9:30 PM	0	0	0	0	51	0	0	0	0	0	0	0	51
9:45 PM	0	0	0	0	40	0	0	0	0	0	0	0	40
10:00 PM	0	0	0	0	29	0	0	0	0	0	0	0	29
10:15 PM	0	0	0	0	46	0	0	0	0	0	0	0	46
10:30 PM	0	0	0	0	43	0	0	0	0	0	0	0	43
10:45 PM	0	0	0	0	41	0	0	0	0	0	0	0	41
11:00 PM	0	0	0	0	55	0	0	0	0	0	0	0	55
11:15 PM	0	0	0	0	35	0	0	0	0	0	0	0	35
11:30 PM	0	0	0	0	40	0	0	0	0	0	0	0	40
11:45 PM	0	0	0	0	33	0	0	0	0	0	0	0	33

Appendix C3

Metrorail Station Capacity Analysis

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

Greenbelt Site Alternative

Prepared by

Louis Berger

for

GSA

October 2015

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C3 Metrorail Station Capacity Analysis

A capacity analysis was conducted for the Greenbelt Metro Station, the station FBI employees would use to access the Greenbelt site via Metrorail. The capacity analysis was performed on the vertical elements of the station at each level, the faregate aisles, fare vending machines, and platform areas. Fifteen-minute ridership totals (entries and exits) were obtained for October of 2014 for the station entrance (WMATA 2014a). Note that the capacity analysis tables throughout the TIA appendix include rounding; therefore, values may not add up to the precise value indicated.

C3.1 Methodology

C3.1.1 Vertical Element Methodology

To conduct the vertical element capacity analysis, the volume of passengers using escalators and stairs between the street and mezzanine and mezzanine and platform were compared to their capacity for the weekday peak 15-minute period of exiting passengers. Capacities and assumptions were based on the *Transit Capacity and Quality of Service Manual* (TCQSM) and previous WMATA studies, including the *Naylor Road Station Access & Capacity Study* (TRB 2013; WMATA 2012).

To calculate 15-minute escalator and stair capacity for each vertical movement at a station, the standard escalator capacity of 90 people per minute and standard stair capacity of 10 people per foot (of width) per minute were multiplied by the number of each and 15 (resulting in a 15-minute capacity of 1,350 passengers per escalator). To calculate 15-minute passenger volumes using each, first a peaking factor of 1.28 was used to adjust peak 15-minute entry and exit volumes to account for uneven distributions over the 15-minute period (i.e., surges of passengers exiting when a train offloads – a value determined by WMATA based on previous station capacity studies). Then, these adjusted volumes were multiplied by the proportion of passengers using escalators, stairs, or elevators. These proportions were based on the following assumptions:

Five percent of all passengers typically use elevators, according to WMATA,
When a stair is provided adjacent to an escalator, approximately 10 percent of passengers will use the stair even when the escalator is traveling in the same direction, and
The overall configuration of the escalators and stairs.

Finally, the volume to capacity (v/c) ratio was calculated for the vertical elements for each vertical movement, separated by those serving entries to the station and those serving exits. A v/c ratio of 0.7 was considered to be "at capacity," in accordance with previous WMATA studies, including the *Naylor Road Station Access & Capacity Study.* Table C3-1 summarizes the assumptions used in the vertical element capacity analysis.

Table C3-1: Assumptions Used in Vertical Element Capacity Analysis

Assumption	Value	Source
Peaking Factor	1.28	WMATA
Escalator: Passengers/Minute	90	TCQSM
Stairs: Passengers/Foot/Minute	10	TCQSM
Percent Passengers Using Elevator	5%	WMATA

Source: WMATA (2012); TRB (2013)

C3.1.2 Faregate Aisle Methodology

Similar to the vertical capacity analysis, the peak number of passengers using the faregate aisles in a 15-minute period was compared to the capacity of the faregate aisles. Faregate aisles can accommodate 35 passengers per minute, according to WMATA (2012). To calculate a 15-minute capacity for faregate aisles at the station, this figure was multiplied by the number of regular faregate aisles and 15 minutes. To account for uneven distributions of passengers entering and exiting the station, a peaking factor of 1.28 was applied to the 15-minute ridership. Faregate aisle directions can be adjusted to meet demand throughout the day, and thus entries and exits were analyzed together. ADA faregate aisles were not included in the capacity for each station entrance, given that they are intended to serve passengers with disabilities. The capacity analysis for faregate aisles is reported as a v/c ratio, and the number of faregate aisles necessary to accommodate existing peak entries and exits at a v/c ratio of 0.7, which is considered capacity.

In the future, WMATA plans to upgrade its faregate aisle technology to provide more capacity per minute and new payment forms. Since the new faregate aisle technology is only in the pilot stage and therefore it is unknown whether or not the new technology will in fact be adopted, this analysis uses the current faregate aisle capacity of 35 passengers per minute to provide the most conservative estimates.

C3.1.3 Fare Vending Machine Methodology

The fare vending machine capacity analysis compared the number of existing (or projected) transactions at fare vending machines during the peak 15-minute entering period to the transaction capacity of the fare vending machines. According to WMATA, at end-of-line stations where the majority of passengers are regular commuters, approximately four percent of passengers using a station will use fare vending machines, and the machines can process between 1.5 and 1.67 transactions per minute (WMATA 2014b). Like the vertical element and faregate aisle capacity analyses, a peaking factor of 1.28 was used to account for surges of passengers when trains offload. The capacity analysis for faregate vending machines is reported as a v/c ratio, and includes the number of fare vending machines necessary to accommodate existing patronage at a v/c ratio of 0.7, which is considered capacity.

C3.1.4 Platform Area Analysis Methodology

To determine if the area of each station platform is sufficient to accommodate peak capacity, the space required to accommodate the peak number of passengers entering and exiting a single train was calculated and compared to the net platform area. Net platform areas were calculated by subtracting the area occupied by vertical elements, pylons, benches, advertisements, platform edges, detectable warning panels, and other elements on platforms from the total platform area (WMATA Station Plans 2015 and site visits in January 2015).

The analysis used existing (or projected) entries and exits for each station's 15-minute peak entry period to account for the highest number of passengers waiting on a platform at a given time. Using the peak headway for the platform being analyzed, the number of people waiting for a single train (entries per train) was calculated along with the number of people exiting a single train (exits per train). To adjust ridership for schedule irregularities and uneven distributions of passengers per train, a missed headway factor of two and a peaking factor of 1.28 were used to adjust entries per train, while the peaking factor only was used to adjust exits per train. A missed headway factor adjusts waiting passenger volume per train for service disruptions when a trip is missed, and therefore the headway is doubled.

Since passengers tend to congregate near vertical elements (stairs and escalators), to account for uneven passenger distribution along the platform, the net platform areas were split into three 200-foot long sections. Each section was assigned a different weight, 50 percent, 35 percent, and 15 percent, to reflect the percentage of

passengers waiting or exiting trains in the respective area. Adjusted entries and exits were multiplied by each platform area's respective weight to determine how many passengers enter and exit per train in each section.

The maximum area occupied by passengers waiting to enter a train and the area occupied by exiting passengers were calculated to ensure that the platform capacity can accommodate both sets of passengers while a train is serving the platform. Using a spacing per passenger of 10 ft^2 (pedestrian level of service B), the remaining unoccupied space in each platform section was calculated. If this figure was negative, the pedestrian level of service was calculated and reported (since it would be less than level of service B). The maximum queue of passengers waiting on the platform was also calculated, by dividing the area occupied by waiting passengers by 200 feet. A list of assumptions used in the platform area analysis is included in table C3-2.

Table C3-2: Assumptions Used in Platform Area Analysis

Assumption	Amount	Unit	Source/ Formula
Missed Headway Factor	2	-	WMATA
Peaking Factor	1.28	-	WMATA
Spacing per Person (LOS B)	10	ft^2/person	WMATA, TCQSM

Source: WMATA (2012); TRB (2013)

C3.2 Existing Condition Metrorail Capacity Analysis

At the Greenbelt Metro Station, there are only vertical elements between the platform and mezzanine, as the mezzanine is located at street level. The peak exiting period is between 5:00 PM and 5:15 PM and the peak entering period is between 7:15 AM and 7:30 AM.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table C3-3.

Table C3-3: Greenbelt Metro Station Mezzanine-to-Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	85%	= 1 - #9 - #7
6	Percent Exits Using Escalator	0%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	10%	TCQSM
10	Percent Exits Using Stairs	95%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	55	WMATA

#	Assumption	Value	Source/Formula
12	15-Minute Exits	353	WMATA
13	Adjusted 15-Minute Entries	71	= #11 x #2
14	Adjusted 15-Minute Exits	452	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	60	= #13 x #5
16	Adjusted Exit Escalator Volume	0	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	0	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	0	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.02**	= #15 / #19
22	**Exit Escalator V/C**	**-**	= #16 / #20
Stairs			
23	Adjusted Entry Stair Volumes	7	= #13 x #9
24	Adjusted Exit Stair Volumes	429	= #14 x #10
25	Stairs	2	Site Visit
26	Stair Width (Feet)	4.0	WMATA
27	Stair Capacity* (15-Minute)	1,080	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.40**	= (#23 + #24) / #27

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Both escalators at the station typically operate in the upward direction (serving entries), while the adjacent two staircases typically accommodate passengers exiting. Approximately 60 passengers would use the two entry escalators during the peak 15-minute period. The resulting volume to capacity (v/c) ratio for the entry escalators was 0.02, well below 0.7, which is considered capacity.

The staircases at the station are each paired with an escalator that operates in the upward direction (serving entries), because the platform is above the mezzanine, meaning the staircases are primarily used by exiting passengers. Approximately seven passengers would use the staircase to enter the station, while 429 would use them to exit the station during the peak 15-minute period. The 15-minute capacity of each staircase was calculated by multiplying the capacity of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With two, 4-foot wide staircases, the 15-minue capacity was calculated at 1,080 passengers. Overall, the resulting v/c ratio for the staircase was 0.4. This v/c is below 0.7, which is considered capacity.

Faregate Aisle Capacity

Greenbelt Metro Station currently has eight faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a v/c ratio of 0.14, well below 0.7, which would be considered capacity. Current ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the seven that are provided are more than sufficient. Table C3-4 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table C3-4: Greenbelt Metro Station Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	55	WMATA
6	Exits	353	WMATA
7	Adjusted Entries	71	= #5 x #2
8	Adjusted Exits	452	= #6 x #2
9	Total Adjusted Volume	522	= #7 + #8
Current Fare Infrastructure			
10	Regular Aisles	7	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	8	Site Visit
13	Current 15-Minute Capacity	3,675	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.14**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / # 3 / #4 / 15

Fare Vending Machines

Greenbelt Metro Station has eight fare vending machines, and therefore can accommodate 200 passengers in a 15-minute period. Approximately 20 passengers could attempt to use them during the peak 15-minute period. This equates to a v/c ratio of 0.10, below the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately two fare vending machines would be necessary to meet current demand. Table C3-5 summarizes the fare vending machine capacity analysis.

Table C3-5: Greenbelt Metro Station Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	7:15 AM to 7:30 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	4%	WMATA
4	Fare Vendors: People Per Minute	1.67	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	361	WMATA
7	Exits	36	WMATA
8	Adjusted Entries	463	= #6 x #2
9	Adjusted Exits	47	= #7 x #2

#	Assumption	Value	Source/Formula
10	Adjusted Total	509	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	20	= #10 x #3
12	Fare Vendors	8	Site Visit
13	Fare Vendor Capacity	200	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.10**	= #11 / #13
15	**Fare Vendors Needed**	**2**	= #11 / #4 / #5 / 15

Platform Area Analysis

The peak 15-minute entry period at Greenbelt Metro Station is 7:15 AM to 7:30 AM. The net platform area was calculated at 14,387 ft², or three 200-foot long sections of 4,796 ft² each. Table C3-6 details the assumptions and ridership used in in this analysis.

Table C3-6: Greenbelt Metro Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	361	Passengers	WMATA
2	Peak 15-Minute Exits	36	Passengers	WMATA
3	Peak Headway	4	Minutes	WMATA
4	Trains per 15 Minutes per Direction	3	Trains	= 15 / #3
5	Entries per Train	120	Passengers	= #1 / #4
6	Exits per Train	12	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	308	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	47	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	14,387	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (Level of Service B), the most trafficked section of platform would have 3,020 ft² of unoccupied space, while the second and third most trafficked sections would have 3,553 ft² and 4,263 ft² respectively. The longest queue of passengers waiting on the platform would be 7.7 feet, significantly shorter than the usable platform width of 23 feet. Table C3-7 details the platform waiting area calculations for the station.

Table C3-7: Greenbelt Metro Station Platform Waiting Area Analysis Calculations

# *	Assumption	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,796	4,796	4,796	= #12 / 3
14	Waiting Passengers	154	108	46	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	1,542	1,079	463	= #14 x #11
16	Waiting Passenger Queue (ft)	7.7	5.4	2.3	= #15 / 200
17	Exiting Passengers	23	16	7	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	233	163	70	= #17 x #11
19	Net Area Remaining (ft^2)	3,020	3,553	4,263	= #13 - #15 - #18

*Table continued from table C3-6.

C3.3 No-build Condition Metrorail Capacity Analysis

At Greenbelt Metro Station, there are only vertical elements between the platform and mezzanine, as the mezzanine is located at street level. The projected peak exiting period is between 5:00 PM and 5:15 PM.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table C3-8.

Table C3-8: Greenbelt Metro Station Mezzanine-to-Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	85%	= 1 - #9 - #7
6	Percent Exits Using Escalator	0%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	10%	TCQSM
10	Percent Exits Using Stairs	95%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	109	WMATA
12	15-Minute Exits	456	WMATA
13	Adjusted 15-Minute Entries	139	= #11 x #2
14	Adjusted 15-Minute Exits	584	= #12 x #2
Escalators			

#	Assumption	Value	Source/Formula
15	Adjusted Entry Escalator Volume	118	= #13 x #5
16	Adjusted Exit Escalator Volume	0	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	0	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	0	= #18 x #3 x 15
21	**Entry Escalator V/C**	**0.04**	= #15 / #19
22	**Exit Escalator V/C**	**-**	= #16 / #20
	Stairs		
23	Adjusted Entry Stair Volumes	14	= #13 x #9
24	Adjusted Exit Stair Volumes	554	= #14 x #10
25	Stairs	2	Site Visit
26	Stair Width (Feet)	4.0	WMATA
27	Stair Capacity* (15-Minute)	1,080	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.53**	= (#23 + #24) / #27

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Both escalators at the station typically operate in the upward direction (serving entries), while the adjacent two staircases typically accommodate passengers exiting. Approximately 118 passengers would use the two entry escalators during the peak 15-minute period. The resulting projected volume to capacity (v/c) ratio for the entry escalators was 0.04, well below 0.7, which is considered capacity.

The staircases at the station are each paired with an escalator that operates in the upward direction (serving entries), meaning the staircases are primarily used by exiting passengers. Approximately 14 passengers would use the staircase to enter the station, while 554 would use them to exit the station during the peak 15-minute period. The 15-minute capacity of each staircase was calculated by multiplying the capacity of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With two, four-foot wide staircases, the 15-minute capacity was calculated at 1,080 passengers. Overall, the resulting projected v/c ratio for the staircase was 0.53, lower than 0.7 or what is considered capacity.

Faregate Aisle Capacity

Greenbelt Metro Station currently has eight faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a projected v/c ratio of 0.20, well below 0.7, which would be considered capacity. Projected ridership levels at the station would necessitate only two regular faregate aisles to function below capacity, and thus the seven that are provided are more than sufficient. Table C3-9 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table C3-9: Greenbelt Metro Station Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
Ridership			
5	Entries	109	WMATA
6	Exits	456	WMATA
7	Adjusted Entries	139	= #5 x #2
8	Adjusted Exits	584	= #6 x #2
9	Total Adjusted Volume	723	= #7 + #8
Current Fare Infrastructure			
10	Regular Aisles	7	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	8	Site Visit
13	Current 15-Minute Capacity	3,675	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.20**	= #9 / #13
15	**Faregate Aisles Needed**	**2**	= #9 / # 3 / #4 / 15

Fare Vending Machines

Greenbelt Metro Station has eight fare vending machines, and therefore can accommodate 200 passengers in a 15-minute period. Approximately 27 passengers could attempt to use them during the peak 15-minute period. This equates to a projected v/c ratio of 0.14, below the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately two fare vending machines would be necessary to meet projected demand. Table C3-10 summarizes the fare vending machine capacity analysis.

Table C3-10: Greenbelt Metro Station Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	7:15 AM to 7:30 AM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	4%	WMATA
4	Fare Vendors: People Per Minute	1.67	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	458	WMATA
7	Exits	77	WMATA
8	Adjusted Entries	586	= #6 x #2
9	Adjusted Exits	99	= #7 x #2
10	Adjusted Total	685	= #8 + #9

#	Assumption	Value	Source/Formula
Fare Vendors			
11	Adjusted Fare Vendor Volume	27	= #10 x #3
12	Fare Vendors	8	Site Visit
13	Fare Vendor Capacity	200	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.14**	= #11 / #13
15	**Fare Vendors Needed**	**2**	= #11 / #4 / #5 / 15

Platform Area Analysis

The projected peak 15-minute entry period at Greenbelt Metro Station is 7:15 AM to 7:30 AM. The net platform area was calculated at 14,387 ft², or three 200-foot long sections of 4,796 ft² each. Table C3-11 details the assumptions and ridership used in in this analysis.

Table C3-11: Greenbelt Metro Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	458	Passengers	WMATA
2	Peak 15-Minute Exits	77	Passengers	WMATA
3	Peak Headway	4	Minutes	WMATA
4	Trains per 15 Minutes per Direction	3	Trains	= 15 / #3
5	Entries per Train	153	Passengers	= #1 / #4
6	Exits per Train	26	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	390	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	33	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	14,387	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (Level of Service B), the most trafficked section of platform would have 2,678 ft² of unoccupied space, while the second and third most trafficked sections would have 3,313 ft² and 4,160 ft², respectively. The longest queue of passengers waiting on the platform would be 9.8 feet, significantly shorter than the usable platform width of 23 feet. Table C3-12 details the platform waiting area calculations for the station.

Table C3-12: Greenbelt Metro Station Platform Waiting Area Calculations

# *	Assumption	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,796	4,796	4,796	= #12 / 3
14	Waiting Passengers	195	137	59	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	1,952	1,366	586	= #14 x #11

# *	Assumption	Area 1	Area 2	Area 3	Formula
16	Waiting Passenger Queue (ft)	9.8	6.8	2.9	= #15 / 200
17	Exiting Passengers	17	12	5	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	165	116	50	= #17 x #11
19	Net Area Remaining (ft^2)	2,678	3,313	4,160	= #13 - #15 - #18

*Table continued from table C3-11.

C3.4 Build Condition Capacity Analysis

At Greenbelt Metro Station, there are only vertical elements between the platform and mezzanine, as the mezzanine is located at street level. The projected peak exiting period is between 5:00 PM and 5:15 PM.

Mezzanine-to-Platform Vertical Element Capacity

The mezzanine-to-platform vertical element capacity analysis is detailed in table C3-13.

Table C3-13: Greenbelt Metro Station Mezzanine-to-Platform Vertical Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Escalator: Passengers/Minute	90	TCQSM
4	Stairs: Passengers/Foot/Minute	10	TCQSM
5	Percent Entries Using Escalator	85%	= 1 - #9 - #7
6	Percent Exits Using Escalator	0%	= 1 - #10 - #8
7	Percent Entries Using Elevator	5%	WMATA
8	Percent Exits Using Elevator	5%	WMATA
9	Percent Entries Using Stairs	10%	TCQSM
10	Percent Exits Using Stairs	95%	TCQSM, Station layout
Ridership			
11	15-Minute Entries	489	WMATA
12	15-Minute Exits	476	WMATA
13	Adjusted 15-Minute Entries	626	= #11 x #2
14	Adjusted 15-Minute Exits	609	= #12 x #2
Escalators			
15	Adjusted Entry Escalator Volume	532	= #13 x #5
16	Adjusted Exit Escalator Volume	0	= #14 x #6
17	Entry Escalators	2	Site Visit
18	Exit Escalators	0	Site Visit
19	Entry Escalator Capacity (15-Minute)	2,700	= #17 x #3 x 15
20	Exit Escalator Capacity (15-Minute)	0	= #18 x #3 x 15

#	Assumption	Value	Source/Formula
21	**Entry Escalator V/C**	**0.20**	= #15 / #19
22	**Exit Escalator V/C**	**-**	= #16 / #20
	Stairs		
23	Adjusted Entry Stair Volumes	63	= #13 x #9
24	Adjusted Exit Stair Volumes	578	= #14 x #10
25	Stairs	2	Site Visit
26	Stair Width (Feet)	4.0	WMATA
27	Stair Capacity* (15-Minute)	1,080	= #25 x #26 x #4 x 15 x 0.9
28	**Stair V/C**	**0.59**	= (#23 + #24) / #27

*A 10% reduction in capacity is used to account for friction between passengers traveling in different directions.

Both escalators at the station typically operate in the upward direction (serving entries), while the adjacent two staircases typically accommodate passengers exiting. Approximately 532 passengers would use the two entry escalators during the peak 15-minute period. The resulting projected volume to capacity (v/c) ratio for the entry escalators was 0.20, well below 0.7, which is considered capacity.

The staircases at the station are each paired with an escalator that operates in the upward direction (serving entries), meaning the staircases are primarily used by exiting passengers. Approximately 63 passengers would use the staircase to enter the station, while 578 would use them to exit the station during the peak 15-minute period. The 15-minute capacity of each staircase was calculated by multiplying the capacity of 10 people per foot (of width) per minute by 15 minutes and then by 0.9, to account for friction between passengers traveling in opposite directions. With two, four-foot wide staircases, the 15-minute capacity was calculated at 1,080 passengers. Overall, the resulting projected v/c ratio for the staircase was 0.59, lower than 0.7 or what is considered capacity.

Faregate Aisle Capacity

Greenbelt Metro Station currently has eight faregate aisles, including one bi-directional aisle that is ADA-compliant. Overall, the current array of faregate aisles has a projected v/c ratio of 0.34, well below 0.7, which would be considered capacity. Projected ridership levels at the station would necessitate only four regular faregate aisles to function below capacity, and thus the seven that are provided are more than sufficient. Table C3-14 details the assumptions, ridership, and calculations used in the faregate aisle capacity analysis.

Table C3-14: Greenbelt Metro Station Faregate Aisle Capacity Calculations

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Faregate: Passengers/Minute	35	WMATA
4	Capacity V/C	0.7	WMATA
	Ridership		
5	Entries	489	WMATA
6	Exits	476	WMATA
7	Adjusted Entries	626	= #5 x #2
8	Adjusted Exits	609	= #6 x #2

#	Assumption	Value	Source/Formula
9	Total Adjusted Volume	1,235	= #7 + #8
Current Fare Infrastructure			
10	Regular Aisles	7	Site Visit
11	ADA Aisles	1	Site Visit
12	Total Aisles	8	Site Visit
13	Current 15-Minute Capacity	3,675	= #10 x #3 x 15
14	**Current Faregate Aisle V/C**	**0.34**	= #9 / #13
15	**Faregate Aisles Needed**	**4**	= #9 / # 3 / #4 / 15

Fare Vending Machines

Greenbelt Metro Station has eight fare vending machines, and therefore can accommodate 200 passengers in a 15-minute period. Approximately 49 passengers could attempt to use them during the peak 15-minute period. This equates to a projected v/c ratio of 0.25, below the acceptable capacity of 0.7. Using a v/c of 0.7 as capacity, approximately three fare vending machines would be necessary to meet projected demand. Table C3-15 summarizes the fare vending machine capacity analysis.

Table C3-15: Greenbelt Metro Station Fare Vending Machines Capacity Analysis Results

#	Assumption	Value	Source/Formula
1	Peak 15-Minute Period	5:00 PM to 5:15 PM	WMATA
2	Peaking Factor	1.28	WMATA
3	Percent Passengers Using Fare Vendors	4%	WMATA
4	Fare Vendors: People Per Minute	1.67	WMATA
5	Capacity V/C	0.7	WMATA
Ridership			
6	Entries	489	WMATA
7	Exits	476	WMATA
8	Adjusted Entries	626	= #6 x #2
9	Adjusted Exits	609	= #7 x #2
10	Adjusted Total	1,235	= #8 + #9
Fare Vendors			
11	Adjusted Fare Vendor Volume	49	= #10 x #3
12	Fare Vendors	8	Site Visit
13	Fare Vendor Capacity	200	= #12 x #4 x 15
14	**Fare Vendor V/C**	**0.25**	= #11 / #13
15	**Fare Vendors Needed**	**3**	= #11 / #4 / #5 / 15

Platform Area Analysis

The projected peak 15-minute entry period at Greenbelt Metro Station is 5:00 PM to 5:15 PM under the Build Condition. This time period constitutes a change from No-build Condition when the peak entry period was 7:15 AM to 7:30 AM, due to the additional passenger trips associated with the Build Condition during the PM peak

period. The net platform area was calculated at 14,387 ft², or three 200-foot long sections of 4,796 ft² each. Table C3-16 details the assumptions and ridership used in in this analysis.

Table C3-16: Greenbelt Metro Station Platform Area Analysis Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Peak 15-Minute Entries	489	Passengers	WMATA
2	Peak 15-Minute Exits	476	Passengers	WMATA
3	Peak Headway	4	Minutes	WMATA
4	Trains per 15 Minutes per Direction	3	Trains	= 15 / #3
5	Entries per Train	163	Passengers	= #1 / #4
6	Exits per Train	159	Passengers	= #2 / #4
7	Missed Headway Factor	2	-	WMATA
8	Peaking Factor	1.28	-	WMATA
9	Adjusted Entries per Train	418	Passengers	= #5 x #7 x #8
10	Adjusted Exits per Train	203	Passengers	= #6 x #8
11	Spacing per Person (LOS B)	10	ft^2/person	WMATA
12	Platform Space Available	14,387	ft^2	Station Layout from WMATA

Using a spacing per passenger of 10 ft^2 (Level of Service B), the most trafficked section of platform would have 1,694 ft² of unoccupied space, while the second and third most trafficked sections would have 2,624 ft² and 3,865 ft² respectively. The longest queue of passengers waiting on the platform would be 10.4 feet, significantly shorter than the usable platform width of 23 feet. Table C3-17 details the platform waiting area calculations for the station.

Table C3-17: Greenbelt Metro Station Platform Waiting Area Calculations

# *	Assumption	Area 1	Area 2	Area 3	Formula
13	Area (ft^2)	4,796	4,796	4,796	= #12 / 3
14	Waiting Passengers	209	146	63	Area 1 = #9 x 0.50 Area 2 = #9 x 0.35 Area 3 = #9 x 0.15
15	Waiting Passenger Area (ft^2)	2,088	1,461	626	= #14 x #11
16	Waiting Passenger Queue (ft)	10.4	7.3	3.1	= #15 / 200
17	Exiting Passengers	101	71	30	Area 1 = #10 x 0.50 Area 2 = #10 x 0.35 Area 3 = #10 x 0.15
18	Exiting Passenger Area (ft^2)	1,014	710	304	= #17 x #11
19	Net Area Remaining (ft^2)	1,694	2,624	3,865	= #13 - #15 - #18

*Table continued from table C3-16.

C3.5 References

Transportation Research Board (TRB)

2013 Transit Capacity and Quality of Service Manual, 3rd Edition. Transportation Research Board for the National Academies of Science. Available online at: http://www.trb.org/main/blurbs/169437.aspx, accessed December 19, 2014.

Washington Metropolitan Area Transportation Authority (WMATA)

2012 WMATA Naylor Road Station Access and Capacity Study. Available online at: https://www.wmata.com/pdfs/planning/Naylor%20Road%20Metro%20Station%20Area%20Access%20and%20Capacity%20Study%20Final%20Report.pdf, accessed January 9, 2015.

2014a Metrorail Station Faregate Data, October 2014. Received December 16, 2014.

2014b Email from Robin McElhenny-Smith and Danielle Wesolek (WMATA employees) about fare vending machine transaction rates and usage, received on January 27, 2014.

Site Visits

1. Station site visits, FourSquare, January 2015.

Appendix C4

Metrorail Station Evacuation Analysis

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

Greenbelt Site Alternative

Prepared by

Louis Berger

for

GSA

October 2015

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C4 Metrorail Station Evacuation Analysis

Although WMATA is not required to meet National Fire Protection Association (NFPA) 130 standards, it requested an evacuation analysis be conducted in order to evaluate evacuation capacities and procedures because WMATA typically performs this analysis for all its station capacity analysis studies.

NFPA 130 details specific requirements for station capacity during emergency situations (TRB 2013). Specifically, the following is required:

- All passengers clear the platform in less than four minutes;
- All passengers must be able to reach a "point of safety" within six minutes;
- Passengers move more quickly on stairs than under normal operating conditions, increasing the capacity from 10 feet per minute to approximately 19 feet per minute; and
- One of the escalators must be assumed to be out of service, and the capacity of the remaining escalators is assumed to be the same as a stair.

C4.1 Methodology

The evacuation analysis uses a number of factors to calculate platform evacuation time and station evacuation time to a point of safety. The number of passengers who would need to evacuate is based on the total amount waiting on the platform for each train multiplied by two (in order to account for a worst-case scenario where a single train headway is missed) and an entire trainload of passengers needing to off-load and exit. Since the Greenbelt Metro Station is an end-of-the-line station, these totals can easily be estimated based on the 15-minute ridership data and the train headway (WMATA 2014a; WMATA 2014b). A peaking factor of 1.28 is also used in order to account for an uneven distribution of passengers on each train within the peak 15-minute period (WMATA 2012). Walking distances between the ends of the platform and vertical elements, vertical elements and faregate aisles, faregate aisles and the station exterior, and walking distances on vertical elements themselves are all factors, as are the flow rates of passengers through vertical elements and faregate aisles.

The overall platform evacuation time is calculated by adding the longest walking time on the platform to reach the vertical elements to the waiting time at the vertical elements. The "point of safety" evacuation time is calculated by adding the platform evacuation time to the walking time on the platform-to-mezzanine vertical elements, the walking time between the platform-to-mezzanine vertical elements and the fare aisles, the waiting time at the fare aisles, the walking time between the fare aisles and the mezzanine-to-street vertical elements, and the walking time on the mezzanine-to-street vertical elements. Waiting times only exist if volumes flowing through an element exceed their capacity in the amount of time between when the first passenger reaches them and the last passenger reaches them (see figure C4-1). For example, if it takes three minutes for the last passengers to reach the platform/mezzanine vertical elements at the platform level, then the platform/mezzanine vertical elements have three minutes to clear all passengers to avoid having a waiting time. If there are 500 passengers to clear in this three minutes but only a vertical element that clears 100 passengers per minute, then in three minutes only 300 of the 500 passengers are cleared, and the remaining 200 passengers would form a queue that would take an additional two minutes (waiting time) to clear.

Figure C4-1: NFPA Evacuation Analysis, Walking, and Waiting Times

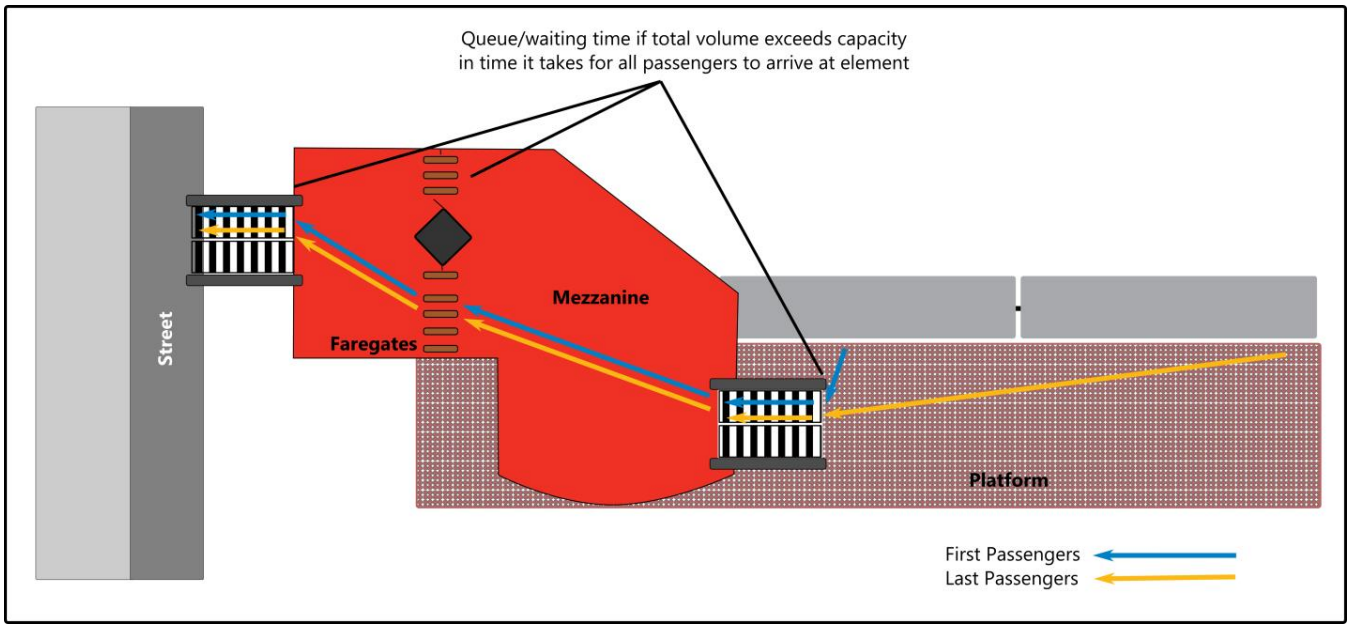

Table C4-1 details the NFPA 130 standards and assumptions used in this analysis. Walking speeds, stair capacity, and fare aisle capacities are all based on NFPA 130 standards. Note that the evacuation analysis tables throughout the TIA appendix include rounding; therefore, values may not add up to the precise value indicated.

Table C4-1: NFPA 130 Inputs and Assumptions

#	Assumption	Amount	Unit	Source/Formula
1	Metrorail Capacity	120	pax/car	WMATA
2	Escalator Width	4	ft	Site Inventory
3	Stair Width	5	ft	Site Inventory
4	Peaking Factor	1.28	-	WMATA
5	Missed Headway Factor	2.0	-	NFPA 130
6	Walking Speed	124	ft/min	NFPA 130
7	Vertical Walking Speed	48	ft/min	NFPA 130
8	Capacity for Stairs	19	pax/ft/min	NFPA 130
9	Fare Aisle Capacity	50	pax/min	NFPA 130
10	ADA and Service Fare Aisle Capacity*	75	pax/min	NFPA 130

*In an evacuation situation, all fare aisles would be opened, and since the ADA aisle is wider than regular aisles, it has a higher capacity.
Note: pax = passengers, ft = feet, min = minute

C4.2 Existing Condition NFPA 130 Evacuation Analysis

The peak period analyzed was between 5:00 PM and 5:15 PM, when 55 passengers enter the station and 353 exit the station. Based on a peak headway of four minutes, three trains would serve the station during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) is approximately 47

passengers. The maximum number of passengers exiting per train is 151, resulting in 198 passengers who would need to evacuate the station. Table C4-2 details the calculations for adjusted ridership.

Table C4-2: Adjusted Ridership for Greenbelt Metro Station Evacuation Analysis

#	Ridership Calculations	Amount	Unit	Source/Formula
1	Metrorail Capacity	120	pax/car	WMATA
2	Escalator Width	4	ft	Site Inventory
3	Stair Width	5	ft	Site Inventory
4	Peaking Factor	1.28	-	WMATA
5	Missed Headway Factor	2.0	-	NFPA 130
6	Walking Speed	124	ft/min	NFPA 130
7	Vertical Walking Speed	48	ft/min	NFPA 130
8	Capacity for Stairs	19	pax/ft/min	NFPA 130
9	Fare Aisle Capacity	50	pax/min	NFPA 130
10	ADA Fare Aisle Capacity	75	pax/min	NFPA 130
11	15-Minute Entries	55	Passengers	WMATA
12	15-Minute Exits	353	Passengers	WMATA
13	Peak Headway	4	Minutes	WMATA
14	Trains per 15-Minutes	3	--	= 15 / #13 (rounded)
15	Entries per Train	18	Passengers	= #11 / #14
16	Exits per Train	118	Passengers	= #12 / #14
17	Adjusted Entries per Train	47	Passengers	= #15 x #4 x #5
18	Adjusted Exits per Train	151	Passengers	= #16 x #4
19	Adjusted Total Passengers per Train	198	Passengers	= #17 + #18

Note: pax = passengers, ft = feet, min = minute

The full NFPA 130 analysis is detailed in table C4-3. Following NFPA 130 standards, only a single platform-to-mezzanine escalator would be usable along with the two staircases. This provides sufficient capacity to clear all passengers from the platform without any waiting time. Therefore, the overall platform clearance time would be equal to the maximum walking time of 1.7 minutes between the farthest end of the platform and the platform-to-mezzanine escalators and stairs.

To reach a point of safety, it would take an additional 2.0 minutes of walking time for all passengers to walk down the platform-to-mezzanine escalators and stairs, through the faregate aisles, and out to the bus loop. There would be no waiting time at the fare aisles, as they have sufficient capacity to clear all passengers in the amount of time it takes all passengers to reach them. Overall, the total time to reach a point of safety is approximately 3.7 minutes.

Table C4-3: NFPA 130 Evacuation Analysis for Greenbelt Metro Station

Platform to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	2	4.0	19	152

Escalators	1	4.0	19	76
Total				**228**

Faregate Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	7		50	350
Service Gate	2		75	150
Total				**575**

Walking Time for Last Passenger (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		210	124	1.7	1.7
Platform/Mezzanine Vertical		40	48	0.8	2.5
Platform/Mezzanine Vertical to Fare Aisles		65	124	0.5	3.1
Faregate Aisles to Exit		80	124	0.6	3.7

Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		40	48	0.8	0.9
Platform/Mezzanine Vertical to Fare Aisles		65	124	0.5	1.4
Faregate Aisles to Exit		80	124	0.6	2.1

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical	1.6	368	0	228	0.0	0.0
Faregate Aisles	1.6	927	0	575	0.0	0.0
Platform Clearance Time	**1.7**					
Point of Safety Time	**3.7**					

Note: pax = passengers, ft = feet, min = minute,
Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element)
Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

C4.3 No-build Condition NFPA 130 Evacuation Analysis

The projected peak period analyzed was between 5:00 PM and 5:15 PM, when a projected 109 passengers would enter the station and 456 would exit the station. Based on a peak headway of four minutes, three trains would serve the station during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be approximately 93 passengers. The maximum number of passengers exiting per train would be 195, resulting in 287 passengers who would need to evacuate the station. Table C4-4 details the calculations for adjusted ridership.

Table C4-4: Adjusted Ridership for Greenbelt Metro Station Evacuation Analysis

#	Ridership Calculations	Amount	Unit	Source/Formula
1	Metrorail Capacity	120	pax/car	WMATA
2	Escalator Width	4	ft	Site Inventory
3	Stair Width	5	ft	Site Inventory
4	Peaking Factor	1.28	-	WMATA
5	Missed Headway Factor	2.0	-	NFPA 130
6	Walking Speed	124	ft/min	NFPA 130
7	Vertical Walking Speed	48	ft/min	NFPA 130
8	Capacity for Stairs	19	pax/ft/min	NFPA 130
9	Fare Aisle Capacity	50	pax/min	NFPA 130
10	ADA Fare Aisle Capacity	75	pax/min	NFPA 130
11	15-Minute Entries	109	Passengers	WMATA
12	15-Minute Exits	456	Passengers	WMATA
13	Peak Headway	4	Minutes	WMATA
14	Trains per 15-Minutes	3	--	= 15 / #13 (rounded)
15	Entries per Train	36	Passengers	= #11 / #14
16	Exits per Train	152	Passengers	= #12 / #14
17	Adjusted Entries per Train	93	Passengers	= #15 x #4 x #5
18	Adjusted Exits per Train	195	Passengers	= #16 x #4
19	Adjusted Total Passengers per Train	287	Passengers	= #17 + #18

Note: pax = passengers, ft = feet, min = minute

The full NFPA 130 analysis is detailed in table C4-5. Following NFPA 130 standards, only a single platform-to-mezzanine escalator would be usable along with the two staircases. This provides sufficient capacity to clear all passengers from the platform without any waiting time. Therefore, the overall platform clearance time would be equal to the maximum walking time of 1.7 minutes between the farthest end of the platform and the platform-to-mezzanine escalators and stairs.

To reach a point of safety, it would take an additional 2.0 minutes of walking time for all passengers to walk down the platform-to-mezzanine escalators and stairs, through the faregate aisles, and out to the bus loop. There would be no waiting time at the fare aisles, as they have sufficient capacity to clear all passengers in the amount of time it takes all passengers to reach them. Overall, the total time to reach a point of safety is approximately 3.7 minutes.

Table C4-5: NFPA 130 Evacuation Analysis for Greenbelt Metro Station

Platform to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	2	4.0	19	152
Escalators	1	4.0	19	76
Total				**228**

Faregate Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	7		50	350
Service Gate	2		75	150
Total				**575**

Walking Time for Last Passenger (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		210	124	1.7	1.7
Platform/Mezzanine Vertical		40	48	0.8	2.5
Platform/Mezzanine Vertical to Fare Aisles		65	124	0.5	3.1
Faregate Aisles to Exit		80	124	0.6	3.7

Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		40	48	0.8	0.9
Platform/Mezzanine Vertical to Fare Aisles		65	124	0.5	1.4
Faregate Aisles to Exit		80	124	0.6	2.1

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical	1.6	368	0	228	0.0	0.0
Faregate Aisles	1.6	927	0	575	0.0	0.0
Platform Clearance Time	**1.7**					
Point of Safety Time	**3.7**					

Note: pax = passengers, ft = feet, min = minute, Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element), Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

C4.4 Build Condition NFPA 130 Evacuation Analysis

The projected peak period analyzed was between 5:00 PM and 5:15 PM, when a projected 489 passengers would enter the station and 476 would exit the station. Based on a peak headway of four minutes, three trains would serve the station during the peak 15-minute period. Applying the missed headway factor of 2.0 and the peaking factor of 1.28, the total number of passengers waiting on the platform for train arrivals at one time (adjusted entries per train) would be approximately 418 passengers. The maximum number of passengers exiting per train would be 203, resulting in 620 passengers who would need to evacuate the station. Table C4-6 details the calculations for adjusted ridership.

Table C4-6: Adjusted Ridership for Greenbelt Metro Station Evacuation Analysis

#	Ridership Calculations	Amount	Unit	Source/Formula
1	Metrorail Capacity	120	pax/car	WMATA
2	Escalator Width	4	ft	Site Inventory
3	Stair Width	5	ft	Site Inventory
4	Peaking Factor	1.28	-	WMATA
5	Missed Headway Factor	2.0	-	NFPA 130
6	Walking Speed	124	ft/min	NFPA 130
7	Vertical Walking Speed	48	ft/min	NFPA 130
8	Capacity for Stairs	19	pax/ft/min	NFPA 130
9	Fare Aisle Capacity	50	pax/min	NFPA 130
10	ADA Fare Aisle Capacity	75	pax/min	NFPA 130
11	15-Minute Entries	489	Passengers	WMATA
12	15-Minute Exits	476	Passengers	WMATA
13	Peak Headway	4	Minutes	WMATA
14	Trains per 15-Minutes	3	-	= 15 / #13 (rounded)
15	Entries per Train	163	Passengers	= #11 / #14
16	Exits per Train	159	Passengers	= #12 / #14
17	Adjusted Entries per Train	418	Passengers	= #15 x #4 x #5
18	Adjusted Exits per Train	203	Passengers	= #16 x #4
19	Adjusted Total Passengers per Train	620	Passengers	= #17 + #18

Note: pax = passengers, ft = feet, min = minute

The full NFPA 130 analysis is detailed in table C4-7. Following NFPA 130 standards, only a single platform-to-mezzanine escalator would be usable along with the two staircases. This would result in a waiting time of approximately 1.1 minutes at these elements. Combined with a maximum walking time of 1.7 minutes between the farthest end of the platform and the platform-to-mezzanine escalators and stairs, the overall platform clearance time would be approximately 2.8 minutes.

To reach a point of safety, it would take an additional 2.0 minutes of walking time for all passengers to walk down the platform-to-mezzanine escalators and stairs, through the faregate aisles, and out to the bus loop. There would be no waiting time at the fare aisles, as they have sufficient capacity to clear all passengers in the amount of time it takes all passengers to reach them. Overall, the total time to reach a point of safety is approximately 4.8 minutes.

Table C4-7: NFPA 130 Evacuation Analysis for Greenbelt Metro Station

Platform to Mezzanine Capacity				
	#	Width (Feet)	Pax/Foot/Min	Pax/Min
Stairs	2	4.0	19	152
Escalators	1	4.0	19	76
Total				**228**

Faregate Aisle Capacity				
	#		Pax/Min/Aisle	Pax/Min
ADA Aisle	1		75	75
Regular Aisle	7		50	350
Service Gate	2		75	150
Total				**575**

Walking Time for Last Passenger (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		210	124	1.7	1.7
Platform/Mezzanine Vertical		40	48	0.8	2.5
Platform/Mezzanine Vertical to Fare Aisles		65	124	0.5	3.1
Faregate Aisles to Exit		80	124	0.6	3.7

Walking Time for First Pax (Excluding Wait Time)					
		Length (Feet)	Feet/Min	Min	Cumulative Minutes
Platform to Platform/Mezzanine Vertical		10	124	0.1	0.1
Platform/Mezzanine Vertical		40	48	0.8	0.9
Platform/Mezzanine Vertical to Fare Aisles		65	124	0.5	1.4
Faregate Aisles to Exit		80	124	0.6	2.1

Waiting Time						
	Time to Clear (Min)	Pax Cleared	Additional Pax to Clear	Pax/Min	Min	Cumulative Minutes
Platform/Mezzanine Vertical	1.6	368	253	228	1.1	1.1
Faregate Aisles	2.7	1,565	0	575	0.0	1.1
Platform Clearance Time	**2.8**					
Point of Safety Time	**4.8**					

Note: pax = passengers, ft = feet, min = minute, Time to Clear = (Last Passenger Walking Time) - (First Passenger Walking Time) + (Waiting Time at previous element), Pax Cleared = (Time to Clear) x (Pax/Min)
Additional Pax to Clear = (Adjusted total passengers per train) - (Pax Cleared)
Pax/Min = Total Capacity for Each Element Type
Minutes = (Additional Pax to Clear) / (Pax/Min)

C4.5 References

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2013 Transit Capacity and Quality of Service Manual, 3rd Edition. Transportation Research Board for the National Academies of Science. Available online at: http://www.trb.org/main/blurbs/169437.aspx, accessed December 19, 2014.

Washington Metropolitan Area Transportation Authority (WMATA)

2012 WMATA Naylor Road Station Access and Capacity Study. Available online at: https://www.wmata.com/pdfs/planning/Naylor%20Road%20Metro%20Station%20Area%20Access%20and%20Capacity%20Study%20Final%20Report.pdf, accessed January 9, 2015.

2014a WMATA Greenbelt Metro Station faregate data. October 2014. Received December 16, 2014.

2014b WMATA Metrorail Frequency. Available online at: http://www.wmata.com/rail/frequency.cfm, accessed December 20, 2014.**Site Visits**

1. Station site inventories, FourSquare, December 2014.

Appendix C5

SimTraffic™ Sample Size Determination Statistics

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

Greenbelt Site Alternative

Prepared by

Louis Berger

for

GSA

October 2015

SimTraffic™ Sample Size Determination Statistics

C5.1 Summary of Calibration Process

This appendix contains the statistical Excel sheets used to determine the appropriate number of simulation runs. SimTraffic™ was used to calculate the 95th percentile queue length for each approach at each study area intersection because it provides a more robust analysis than Synchro, and this tool was agreed to in the Site Transportation Agreement. The use of SimTraffic™ involved calibrating a model, ensuring the model runs for the appropriate amount of time, and determining the number of simulation runs to be statistically within a plus or minus 5 percent error. The model was calibrated by adjusting link speeds, turning speeds, and vehicle positioning decision points (distance prior to decision point when vehicles position themselves in the correct lane for upcoming moves). The goal was to adjust the model to resemble a simulation closely representing the Existing Condition. Running the model included a seeding time (time for vehicles to completely travel the network) plus four 15-minute recording times (totaling 60 minutes). Based on the distance from the farthest points on the network, an 8-minute seed time was applied.

The minimum number of simulation runs was calculated by running the simulation for 10 runs. Based on the results of the 10 runs, the standard deviation was calculated using the vehicle hours of travel (VHT) metric. VHT provides a good indication of vehicle delays by requiring more simulations given facility operation and queuing issues. Using the calculated standard deviation, the number of simulations required was calculated to be within plus or minus 5 percent at the 95th percentile confidence level. Because SimTraffic™ varies quite a bit between runs in terms of VHT, even for small networks, a plus or minus 5 percent error was established. The number of simulation runs to reduce the error to 4 percent would require dozens of runs for little gain in accuracy. In some cases where little congestion occurred, 10 runs achieved better than a plus or minus 5 percent error.

C5.2 Glossary of Sheet Terms

Standard Deviation – a measure that is used to quantify the amount of variation among the data values

Confidence Interval (C.I.) – an interval estimate of a parameter

Confidence Level – a range of values likely to contain the parameter of interest

Percent Error – the range of values above and below the sample statistic (or margin of error)

Number of Samples – minimum number of simulation runs required to be within plus or minus 5 percent error at 95th percentile

Mean – average vehicle hours of travel (VHT)

Required Sample Size Existing Condition AM

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	9.40744
Number of Samples	10
95% Confidence Interval	15.9752
Percent Error	**3.3%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	9.40744
Number of Samples	10
Mean	490.5
95% Confidence Interval	15.9753

Required Sample Size Existing Condition PM

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	20.5437
Number of Samples	12
95% Confidence Interval	30.7564
Percent Error	**4.8%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	20.5437
Number of Samples	10
Mean	644.6
95% Confidence Interval	34.8863

Required Sample Size No-build Condition AM

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	35.2887
Number of Samples	21
95% Confidence Interval	37.319
Percent Error	**5.0%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	35.2887
Number of Samples	10
Mean	746.2
95% Confidence Interval	59.9254

Required Sample Size No-build Condition PM

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	57.2586
Number of Samples	23
95% Confidence Interval	57.439
Percent Error	**5.0%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	57.2586
Number of Samples	10
Mean	1141.1
95% Confidence Interval	97.2336

Required Sample Size Build Condition AM

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	33.0335
Number of Samples	12
95% Confidence Interval	49.4552
Percent Error	**4.8%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	33.0335
Number of Samples	10
Mean	1029.9
95% Confidence Interval	56.0958

Required Sample Size Build Condition PM

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	34.9223
Number of Samples	10
95% Confidence Interval	59.3033
Percent Error	**4.8%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	34.9223
Number of Samples	10
Mean	1225.7
95% Confidence Interval	59.3033

Required Sample Size Build with Mitigation Condition AM

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	13.3287
Number of Samples	10
95% Confidence Interval	22.6341
Percent Error	**3.1%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	13.3287
Number of Samples	10
Mean	719.9
95% Confidence Interval	22.6342

Required Sample Size Build with Mitigation Condition PM

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	31.975
Number of Samples	13
95% Confidence Interval	45.4061
Percent Error	**5.0%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	31.975
Number of Samples	10
Mean	910.2
95% Confidence Interval	54.2983

Appendix C6

Metrobus Capacity Analysis Details

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

Greenbelt Site Alternative

Prepared by

Louis Berger

for

GSA

October 2015

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List of Tables

C6 Metrobus Capacity Analysis

Note that the capacity analysis tables throughout the TIA appendix include rounding; therefore, values may not add up to the precise value indicated.

C6.1 No-build Condition Bus Capacity Analysis

To calculate peak hour bus volumes within the study area, the 2014 maximum weekday passenger loads for each route and direction at stops within the study area were averaged by stop. This figure was then multiplied by the number of peak trips per hour to calculate ridership per peak hour by route and direction. These totals were then summed for the site in order to calculate an overall total ridership per peak hour for the study area. To calculate the peak hour capacity of bus services within the study area, the capacity per trip of each bus route during the peak hour was multiplied by the number of trips scheduled in the peak hour. Capacities per trip for each Metrobus route were based on the typical number of seats available on each trip and the WMATA load factor (WMATA 2013a). The additional capacity associated with the five additional AM peak hour and the eight additional PM peak hour bus trips planned with the North Core and South Core developments was then added to the overall study area capacity. This was done by adding one additional bus trip per peak hour to the five route/directions with the most severe capacity issues (Routes 87 north, 87 south, 89 north, 89 south, 89M south, C2 east, G13 west, R11 north, and R12 south).

With the additional bus trips planned with the North Core and South Core developments, no individual routes are projected to experience capacity issues in 2022. Table C6-1 details the No-build Condition bus capacity analysis for the Greenbelt study area.

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Table C6-1: No-build Condition Greenbelt Study Area Bus Capacity Analysis

Route/ Direction	Existing (2014)											2022 No-build													
	AM Max Load	PM Max Load	Seats	Load Factor	Cap	AM Trips/ Hour	PM Trips/ Hour	AM Cap	PM Cap	AM Total Volume	PM Total Volume	AM Volume	PM Volume	AM V/C	PM V/C	AM Planned Projects	PM Planned Projects	AM Total Volume	PM Total Volume	AM Add Cap	PM Add Cap	AM Total Cap	PM Total Cap	AM V/C	PM V/C
87 North	21.8	47.3	40	1.0	40	1.7	2.0	66.7	80.0	36.3	94.6	42.1	109.7	0.63	1.37	1.9	6.4	44.0	116.1	-	120.0	66.7	200.0	0.66	0.58
87 South	43.6	22.1	40	1.0	40	2.0	1.3	80.0	50.0	87.1	27.6	101.0	32.0	1.26	0.64	4.6	1.9	105.6	33.9	80.0	40.0	160.0	90.0	0.66	0.38
89 North	44.4	25.3	40	1.1	44	1.3	1.3	58.7	55.0	59.2	31.7	68.6	36.7	1.17	0.67	3.1	2.2	71.7	38.9	44.0	44.0	102.7	99.0	0.70	0.39
89 South	23.1	31.2	40	1.1	44	1.3	1.0	58.7	44.0	30.8	31.2	35.7	36.2	0.61	0.82	1.6	2.1	37.3	38.3	-	44.0	58.7	88.0	0.64	0.44
89M North	0.0	0.0	40	1.1	44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	-	-
89M South	0.0	43.4	40	1.1	44	0.0	0.3	0.0	11.0	0.0	10.8	0.0	12.6	-	1.14	0.0	0.7	0.0	13.3	-	44.0	0.0	55.0	-	0.24
B30 North	12.0	16.4	40	1.0	40	1.7	1.5	66.7	60.0	20.0	24.6	23.2	28.5	0.35	0.47	1.1	1.7	24.3	30.2	-	-	66.7	60.0	0.36	0.50
B30 South	9.1	13.8	40	1.0	40	1.3	1.5	53.3	60.0	12.2	20.7	14.1	24.0	0.26	0.40	0.6	1.4	14.7	25.4		-	53.3	60.0	0.28	0.42
C2 East	30.4	20.8	40	1.1	44	2.3	3.3	102.7	143.0	71.0	67.5	82.3	78.3	0.80	0.55	3.7	4.6	86.1	82.9	44.0	-	146.7	143.0	0.59	0.58
C2 West	16.9	19.5	40	1.1	44	3.3	2.5	146.7	110.0	56.2	48.7	65.2	56.5	0.44	0.51	3.0	3.3	68.1	59.8	-	-	146.7	110.0	0.46	0.54
G12 East	17.1	22.3	40	1.1	44	2.0	2.0	88.0	88.0	34.3	44.6	39.7	51.7	0.45	0.59	1.8	3.0	41.5	54.7	-	-	88.0	88.0	0.47	0.62
G12 West	25.5	18.6	40	1.1	44	2.0	2.3	88.0	99.0	51.1	41.7	59.2	48.4	0.67	0.49	2.7	2.8	61.9	51.2	-	-	88.0	99.0	0.70	0.52
G13 East	15.0	0.0	40	1.1	44	1.7	0.0	73.3	0.0	25.1	0.0	29.1	0.0	0.40	-	1.3	0.0	30.4	0.0	-	-	73.3	0.0	0.41	-
G13 West	30.2	0.0	40	1.1	44	1.3	0.0	58.7	0.0	40.2	0.0	46.6	0.0	0.79	-	2.1	0.0	48.7	0.0	44.0	-	102.7	0.0	0.47	-
G14 East	13.8	22.0	40	1.1	44	0.7	1.5	29.3	66.0	9.2	32.9	10.7	38.2	0.36	0.58	0.5	2.2	11.2	40.4	-	-	29.3	66.0	0.38	0.61
G14 West	26.6	24.7	40	1.1	44	0.7	1.5	29.3	66.0	17.7	37.1	20.5	43.0	0.70	0.65	0.9	2.5	21.5	45.5	-	-	29.3	66.0	0.73	0.69
G16 East	0.0	23.9	40	1.1	44	0.0	0.5	0.0	22.0	0.0	11.9	0.0	13.9	-	0.63	0.0	0.8	0.0	14.7	-	-	0.0	22.0	-	0.67
G16 West	0.0	7.3	40	1.1	44	0.0	0.3	0.0	11.0	0.0	1.8	0.0	2.1	-	0.19	0.0	0.1	0.0	2.2	-	-	0.0	11.0	-	0.20
R11 North	35.5	0.0	40	1.1	44	1.3	0.0	58.7	0.0	47.3	0.0	54.8	0.0	0.93	-	2.5	0.0	57.3	0.0	44.0	-	102.7	0.0	0.56	-
R11 South	16.3	0.0	40	1.1	44	1.7	0.0	73.3	0.0	27.1	0.0	31.4	0.0	0.43	-	1.4	0.0	32.9	0.0	-	-	73.3	0.0	0.45	-
R12 North	19.9	21.0	40	1.1	44	1.0	2.0	44.0	88.0	19.9	42.0	23.1	48.7	0.52	0.55	1.1	2.9	24.1	51.6	-	-	44.0	88.0	0.55	0.59
R12 South	12.6	31.3	40	1.1	44	0.3	2.0	14.7	88.0	4.2	62.7	4.9	72.7	0.33	0.83	0.2	4.3	5.1	77.0	-	44.0	14.7	132.0	0.35	0.58
R3 North	8.8	6.4	40	1.1	44	1.7	1.5	73.3	66.0	14.7	9.7	17.1	11.2	0.23	0.17	0.8	0.7	17.9	11.8	-	-	73.3	66.0	0.24	0.18
R3 South	4.4	8.0	40	1.1	44	1.7	1.5	73.3	66.0	7.3	11.9	8.5	13.8	0.12	0.21	0.4	0.8	8.9	14.7	-	-	73.3	66.0	0.12	0.22
Total						**31.0**	**29.5**	**1,337**	**1,273**	**671**	**654**	**777.9**	**758.2**	**0.58**	**0.60**	**35.4**	**44.4**	**813.3**	**802.7**	**256.0**	**336.0**	**1,593**	**1,609**	**0.51**	**0.50**

Note: Max = Maximum, Cap = Capacity, Volume = Passenger Volume, Add Cap = Additional Capacity from added bus trips, V/C = Volume to Capacity Ratio.
Source: WMATA (2013a, 2014a); MWCOG (2015)

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WMATA has completed studies of Routes 87, 89, 89M, and C2. Table C6-2 summarizes recommendations in these studies that are planned for implementation prior to the 2022 No-build year within the study area. The recommendations for Route C2 would actually decrease service to the study area, however these recommendations were made prior to knowledge of the planned developments in the study area, and therefore are unlikely to be implemented by WMATA.

Table C6-2: WMATA Studies on Bus Routes in Study Area with Capacity Issues

Study	Recommendation	Recommended Implementation Year
Laurel/Laurel Express Lines (Routes 87,89, and 89M)	Implement 30-minute headways on Route 89	Short-term
	Combine Routes 87, 89, and 89M with a 30-minute peak frequency	Long-term
Greenbelt-Twinbrook Line (Route C2)	Operate route between Takoma-Langley and Greenbelt only, with 30-minute peak headways	Long-term

Source: WMATA (2011, 2013b)

C6.2 Build Condition Bus Capacity Analysis

The additional peak hour bus passenger trips associated with the Greenbelt Build Condition were added to the peak hour bus volumes calculated for the study area in the 2022 No-build Condition. The trips were added proportionally to each route within the study area based on No-build Condition ridership. The overall analysis was limited to Metrobus service, as no ridership data was available for TheBus and the Central Maryland RTA Route G only operates on weekends.

To calculate peak hour bus volumes within the study area, the 2014 maximum weekday passenger loads for each route and direction at stops within the study area were averaged by stop. This figure was then multiplied by the number of peak trips per hour to calculate ridership volumes per peak hour by route and direction. These totals were then grown to the year 2022 using the 1.9 percent annual regional growth rate for the bus mode. The 2022 totals were then summed in order to calculate an overall total ridership per peak hour for the study area.

To calculate the peak hour capacity of bus services within the study area, the capacity per trip of each bus route during the peak hour was multiplied by the number of trips scheduled in the peak hour. Capacities per trip for each Metrobus route were based on the typical number of seats available on each trip multiplied by the WMATA load factor (WMATA 2013a). The additional capacity associated with the five additional AM peak hour and the eight additional PM peak hour bus trips planned with the North Core and South Core developments was then added to the overall study area capacity. This was done by adding one additional bus trip per peak hour to the five route/directions with the most severe capacity issues (Routes 87 north, 87 south, 89 north, 89 south, 89M south, C2 east, G13 west, R11 north, and R12 south).

Table C6-3 details the Build Condition peak hour bus capacity analysis for the Greenbelt study area. No capacity issues are projected in the study area for the Greenbelt Build Condition, nor are capacity issues projected on any individual route in the study area.

Table C6-3: Build Condition Greenbelt Study Area Bus Capacity Analysis

Route/ Direction	Existing (2014)											2022 No-build												2022 Build					
	AM Max Load	PM Max Load	Seats	Load Factor	Cap	AM Trips/ Hour	PM Trips/ Hour	AM Vol	PM Vol	AM Cap	PM Cap	AM Vol	PM Vol	AM PP	PM PP	AM NB Vol	PM NB Vol	AM Add Cap	PM Add Cap	AM Cap	PM Cap	AM V/C	PM V/C	AM FBI Trips	PM FBI Trips	AM Tot Vol	PM Tot Vol	AM V/C	PM V/C
87 North	21.8	47.3	40	1.0	40	1.7	2.0	36.3	94.6	66.7	80.0	42.1	109.7	1.9	6.4	44.0	116.1	0.0	120.0	66.7	200.0	0.66	0.58	10.7	26.4	54.7	142.6	0.82	0.71
87 South	43.6	22.1	40	1.0	40	2.0	1.3	87.1	27.6	80.0	50.0	101.0	32.0	4.6	1.9	105.6	33.9	80.0	40.0	160.0	90.0	0.66	0.38	25.7	7.7	131.3	41.6	0.82	0.46
89 North	44.4	25.3	40	1.1	44	1.3	1.3	59.2	31.7	58.7	55.0	68.6	36.7	3.1	2.2	71.7	38.9	44.0	44.0	102.7	99.0	0.70	0.39	17.4	8.9	89.2	47.7	0.87	0.48
89 South	23.1	31.2	40	1.1	44	1.3	1.0	30.8	31.2	58.7	44.0	35.7	36.2	1.6	2.1	37.3	38.3	0.0	44.0	58.7	88.0	0.64	0.44	9.1	8.7	46.4	47.0	0.79	0.53
89M North	0.0	0.0	40	1.1	44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-
89M South	0.0	43.4	40	1.1	44	0.0	0.3	0.0	10.8	0.0	11.0	0.0	12.6	0.0	0.7	0.0	13.3	0.0	44.0	0.0	55.0	-	0.24	0.0	3.0	0.0	16.3	-	0.30
B30 North	12.0	16.4	40	1.0	40	1.7	1.5	20.0	24.6	66.7	60.0	23.2	28.5	1.1	1.7	24.3	30.2	0.0	0.0	66.7	60.0	0.36	0.50	5.9	6.9	30.2	37.0	0.45	0.62
B30 South	9.1	13.8	40	1.0	40	1.3	1.5	12.2	20.7	53.3	60.0	14.1	24.0	0.6	1.4	14.7	25.4	0.0	0.0	53.3	60.0	0.28	0.42	3.6	5.8	18.3	31.2	0.34	0.52
C2 East	30.4	20.8	40	1.1	44	2.3	3.3	71.0	67.5	102.7	143.0	82.3	78.3	3.7	4.6	86.1	82.9	44.0	0.0	146.7	143.0	0.59	0.58	20.9	18.9	107.0	101.8	0.73	0.71
C2 West	16.9	19.5	40	1.1	44	3.3	2.5	56.2	48.7	146.7	110.0	65.2	56.5	3.0	3.3	68.1	59.8	0.0	0.0	146.7	110.0	0.46	0.54	16.6	13.6	84.7	73.4	0.58	0.67
G12 East	17.1	22.3	40	1.1	44	2.0	2.0	34.3	44.6	88.0	88.0	39.7	51.7	1.8	3.0	41.5	54.7	0.0	0.0	88.0	88.0	0.47	0.62	10.1	12.5	51.6	67.2	0.59	0.76
G12 West	25.5	18.6	40	1.1	44	2.0	2.3	51.1	41.7	88.0	99.0	59.2	48.4	2.7	2.8	61.9	51.2	0.0	0.0	88.0	99.0	0.70	0.52	15.1	11.7	77.0	62.9	0.87	0.64
G13 East	15.0	0.0	40	1.1	44	1.7	0.0	25.1	0.0	73.3	0.0	29.1	0.0	1.3	0.0	30.4	0.0	0.0	0.0	73.3	0.0	0.41	-	7.4	0.0	37.8	0.0	0.52	-
G13 West	30.2	0.0	40	1.1	44	1.3	0.0	40.2	0.0	58.7	0.0	46.6	0.0	2.1	0.0	48.7	0.0	44.0	0.0	102.7	0.0	0.47	-	11.9	0.0	60.6	0.0	0.59	-
G14 East	13.8	22.0	40	1.1	44	0.7	1.5	9.2	32.9	29.3	66.0	10.7	38.2	0.5	2.2	11.2	40.4	0.0	0.0	29.3	66.0	0.38	0.61	2.7	9.2	13.9	49.6	0.47	0.75
G14 West	26.6	24.7	40	1.1	44	0.7	1.5	17.7	37.1	29.3	66.0	20.5	43.0	0.9	2.5	21.5	45.5	0.0	0.0	29.3	66.0	0.73	0.69	5.2	10.4	26.7	55.9	0.91	0.85
G16 East	0.0	23.9	40	1.1	44	0.0	0.5	0.0	11.9	0.0	22.0	0.0	13.9	0.0	0.8	0.0	14.7	0.0	0.0	0.0	22.0	-	0.67	0.0	3.3	0.0	18.0	-	0.82
G16 West	0.0	7.3	40	1.1	44	0.0	0.3	0.0	1.8	0.0	11.0	0.0	2.1	0.0	0.1	0.0	2.2	0.0	0.0	0.0	11.0	-	0.20	0.0	0.5	0.0	2.8	-	0.25
R11 North	35.5	0.0	40	1.1	44	1.3	0.0	47.3	0.0	58.7	0.0	54.8	0.0	2.5	0.0	57.3	0.0	44.0	0.0	102.7	0.0	0.56	-	13.9	0.0	71.3	0.0	0.69	-
R11 South	16.3	0.0	40	1.1	44	1.7	0.0	27.1	0.0	73.3	0.0	31.4	0.0	1.4	0.0	32.9	0.0	0.0	0.0	73.3	0.0	0.45	-	8.0	0.0	40.9	0.0	0.56	-
R12 North	19.9	21.0	40	1.1	44	1.0	2.0	19.9	42.0	44.0	88.0	23.1	48.7	1.1	2.9	24.1	51.6	0.0	0.0	44.0	88.0	0.55	0.59	5.9	11.7	30.0	63.3	0.68	0.72
R12 South	12.6	31.3	40	1.1	44	0.3	2.0	4.2	62.7	14.7	88.0	4.9	72.7	0.2	4.3	5.1	77.0	0.0	44.0	14.7	132.0	0.35	0.58	1.2	17.5	6.3	94.5	0.43	0.72
R3 North	8.8	6.4	40	1.1	44	1.7	1.5	14.7	9.7	73.3	66.0	17.1	11.2	0.8	0.7	17.9	11.8	0.0	0.0	73.3	66.0	0.24	0.18	4.3	2.7	22.2	14.5	0.30	0.22
R3 South	4.4	8.0	40	1.1	44	1.7	1.5	7.3	11.9	73.3	66.0	8.5	13.8	0.4	0.8	8.9	14.7	0.0	0.0	73.3	66.0	0.12	0.22	2.2	3.3	11.0	18.0	0.15	0.27
Total						**31.0**	**29.5**	**671**	**654**	**1,337**	**1,273**	**778**	**758**	**35**	**44**	**813**	**803**	**256**	**336**	**1,593**	**1,609**	**0.51**	**0.50**	**198**	**183**	**1,011**	**985**	**0.63**	**0.61**

Note: Max = Maximum, Cap = Capacity, Vol = Passenger Volume, PP = Passenger Trips from planned projects, NB = No-build Condition, Add Cap = Additional Capacity from added bus trips, Tot Vol = Total Volume, V/C = Volume to Capacity Ratio.
Source: WMATA (2013a, 2014); MWCOG (2015); Greenbelt Site Transportation Agreement.

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C6.3 References

Metropolitan Washington Council of Governments (MWCOG)

2015 Round 8.3 Regional Growth Rates by Mode, 2008-2025. Received on January 20, 2015.

Washington Metropolitan Area Transportation Authority (WMATA)

2011 Metrobus Service Evaluation Study 2011. Available online at: http://www.metrobus-studies.com/MSE%202011/SES%202011%20Part%201,%20Final%20Report.pdf, accessed on April 17, 2015.

2013a WMATA Title VI Service Standards, Policies, and Definitions. Available online at: http://www.wmata.com/about_metro/board_of_directors/board_docs/091213_3BTitleVI.pdf, accessed on February 14, 2015.

2013b Greenbelt-Twinbrook Line Study. Available online at http://www.metrobus-studies.com/C2-C4/C2-C4%20final%20recommendations.pdf, accessed on April 17, 2015.

2014a Metrobus Automatic Passenger Counter (APC) data, October 2014. Received November 19, 2014.

Appendix C7

Background Distributions

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

Greenbelt Site Alternative

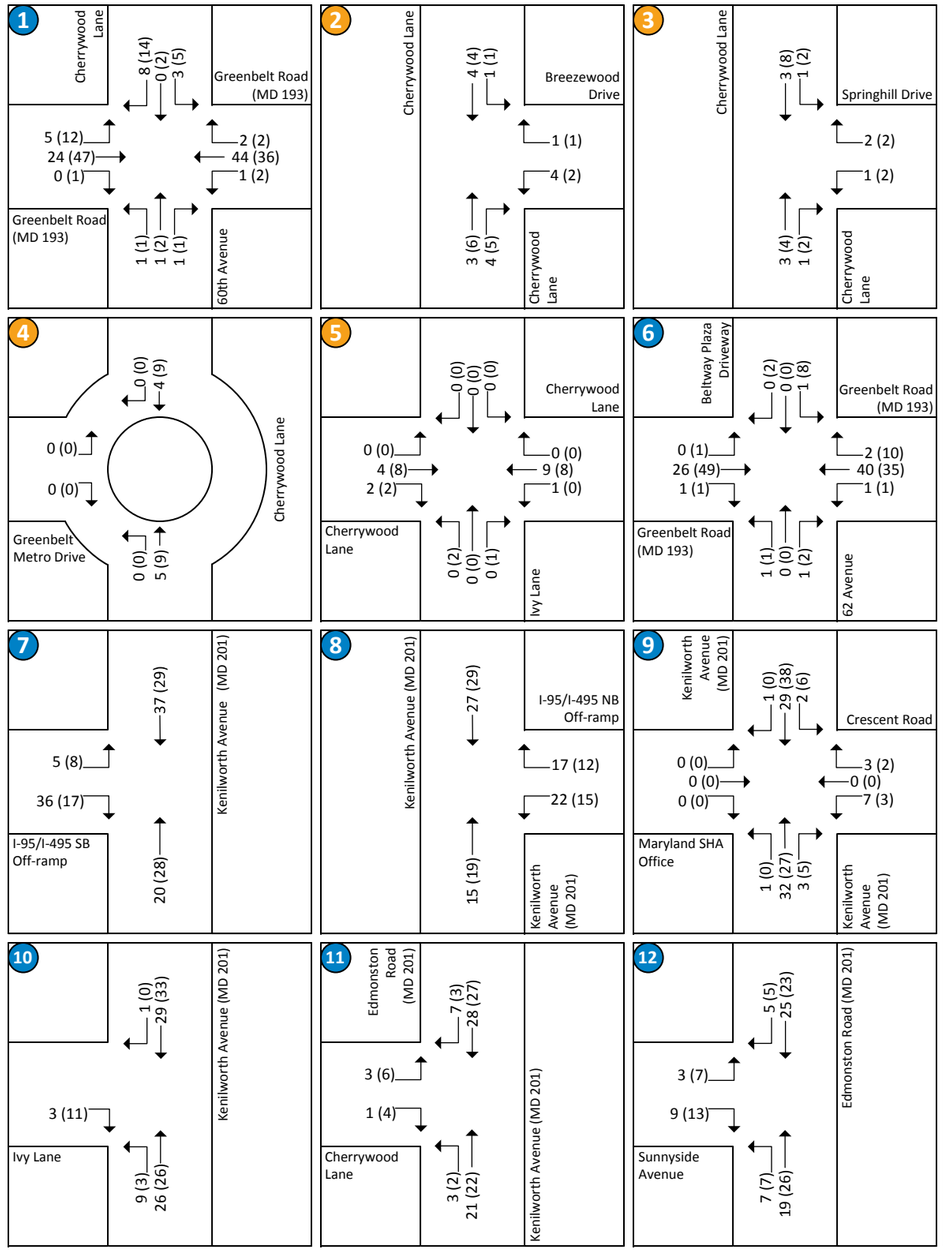
Prepared by

Louis Berger

for

GSA

October 2015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Baltimore Ave
Rhode Island Ave
Greenbelt
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
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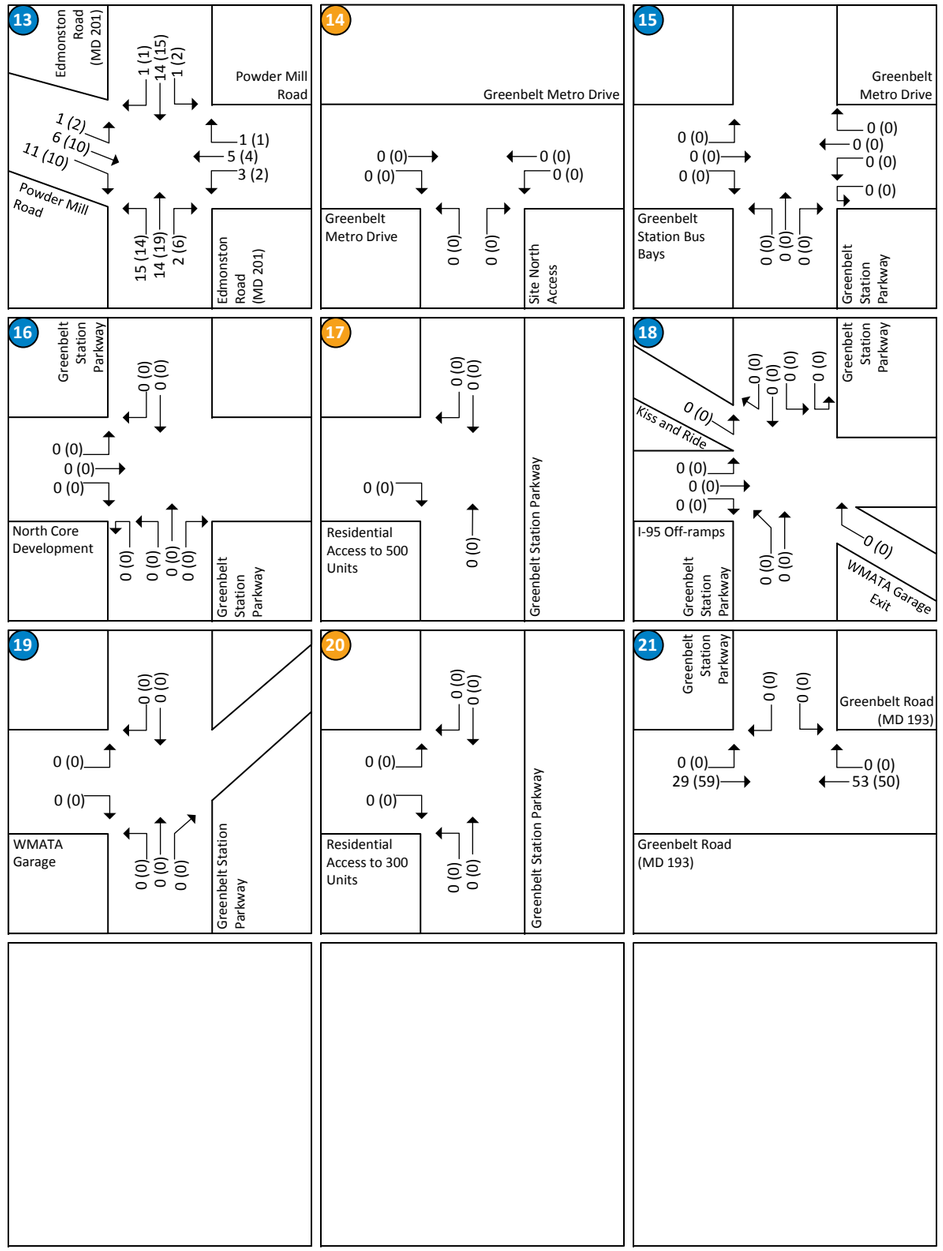
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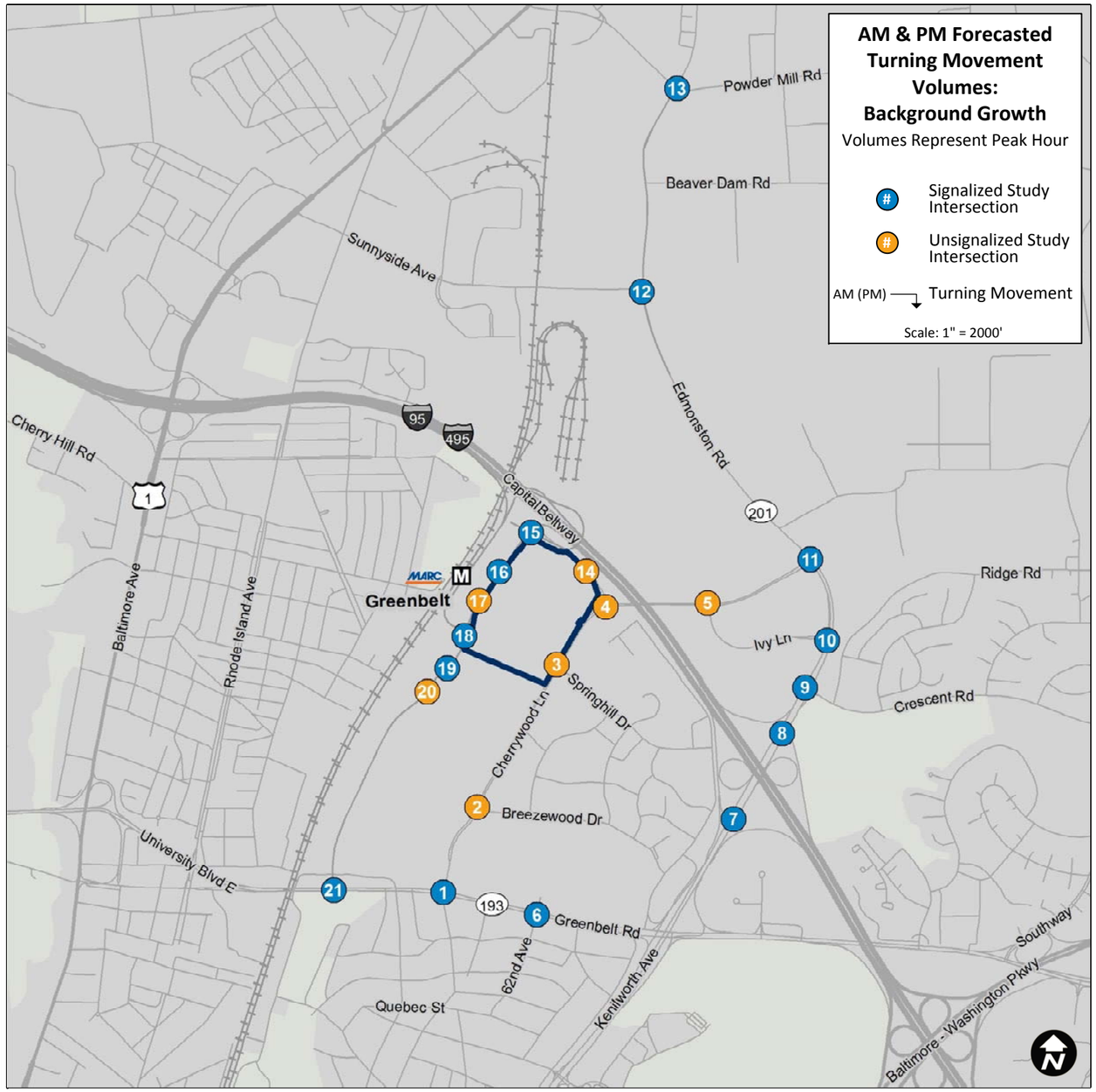
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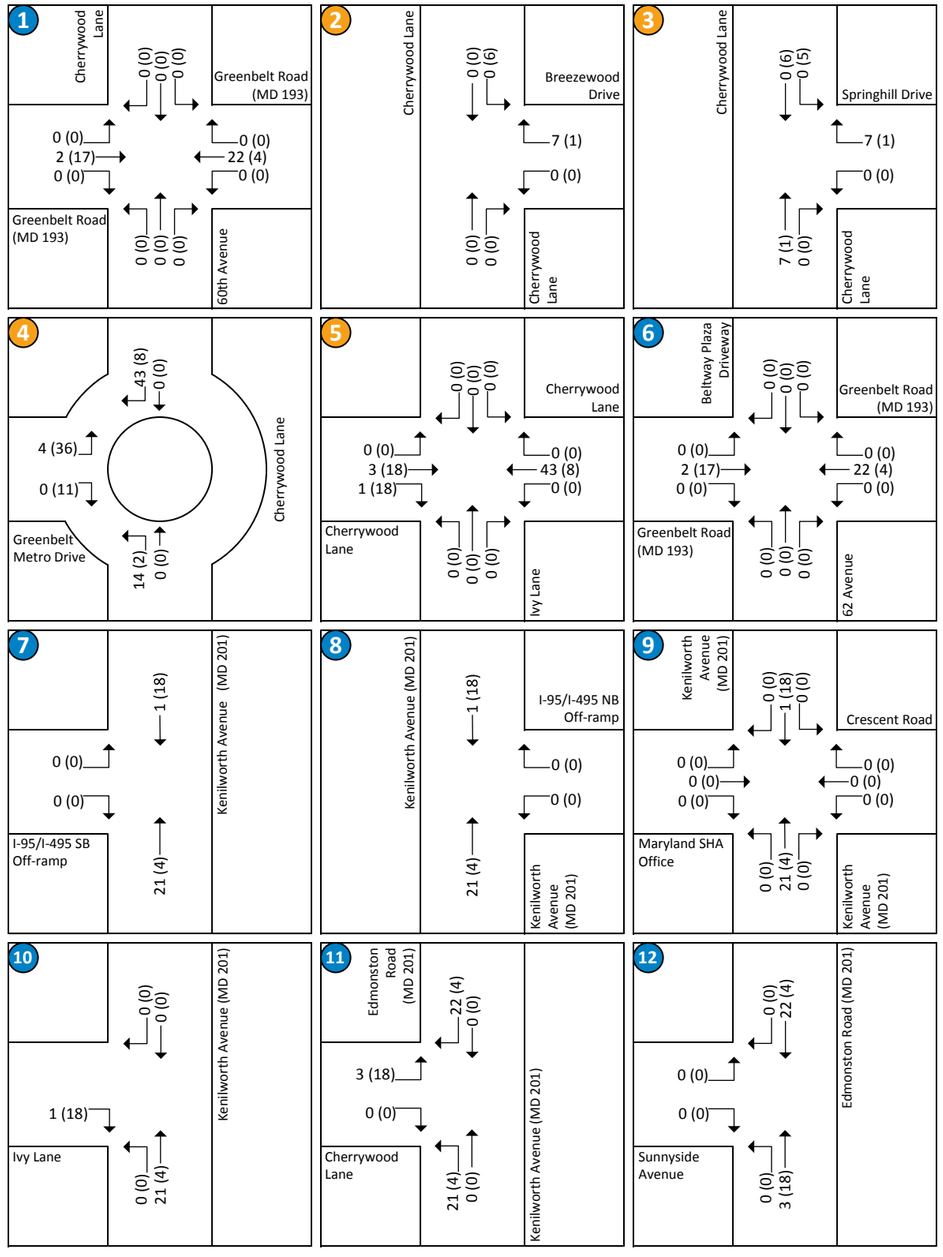
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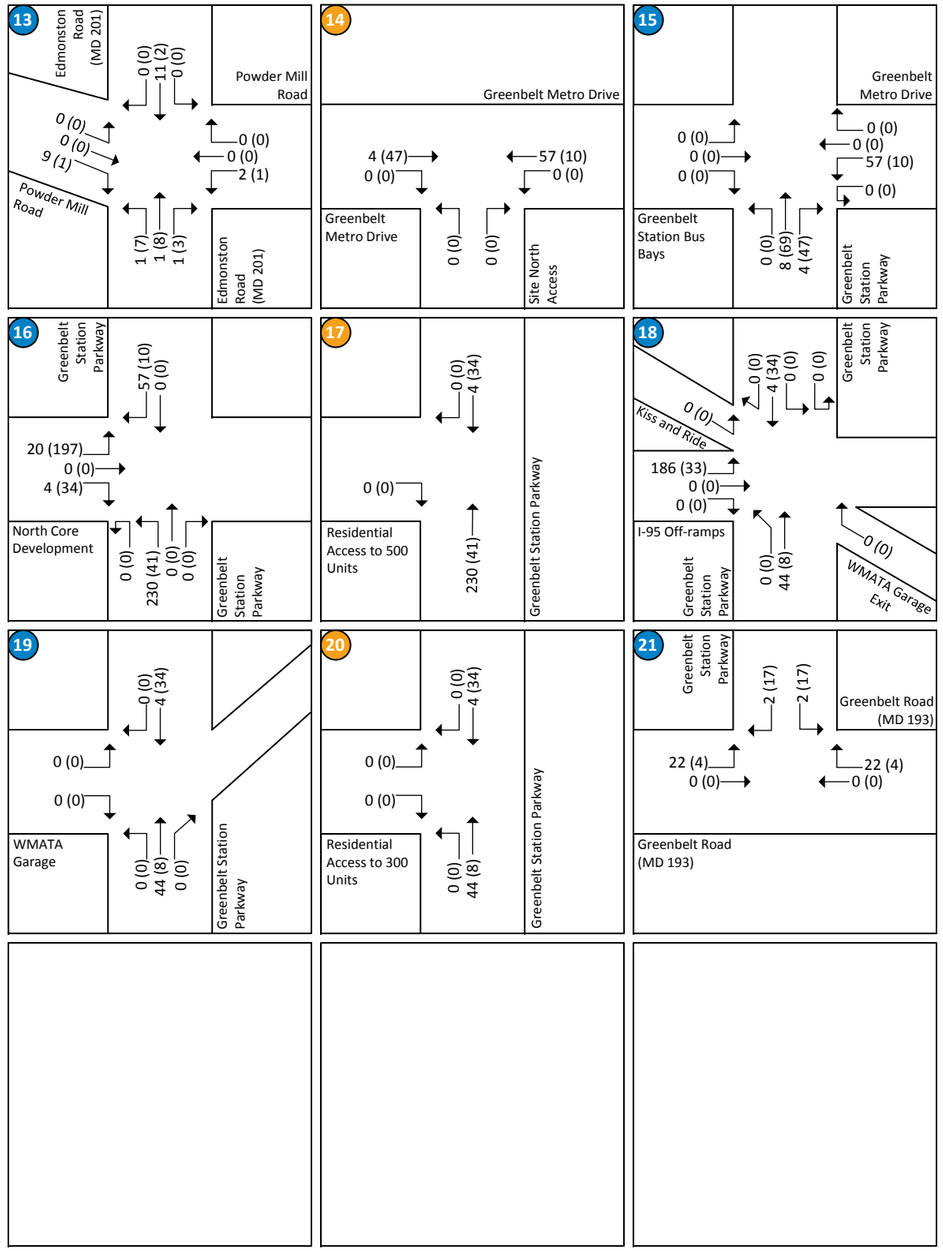
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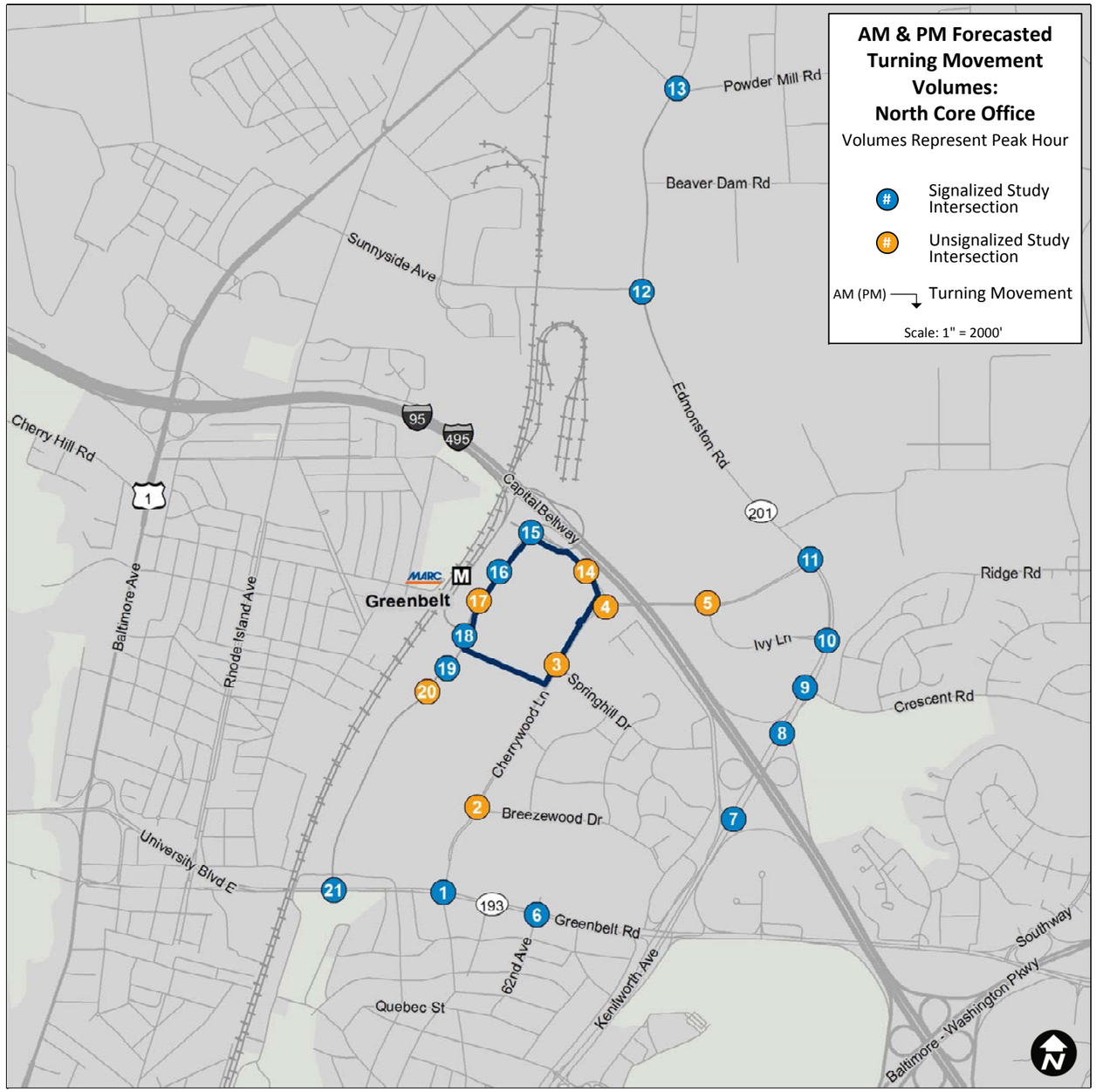
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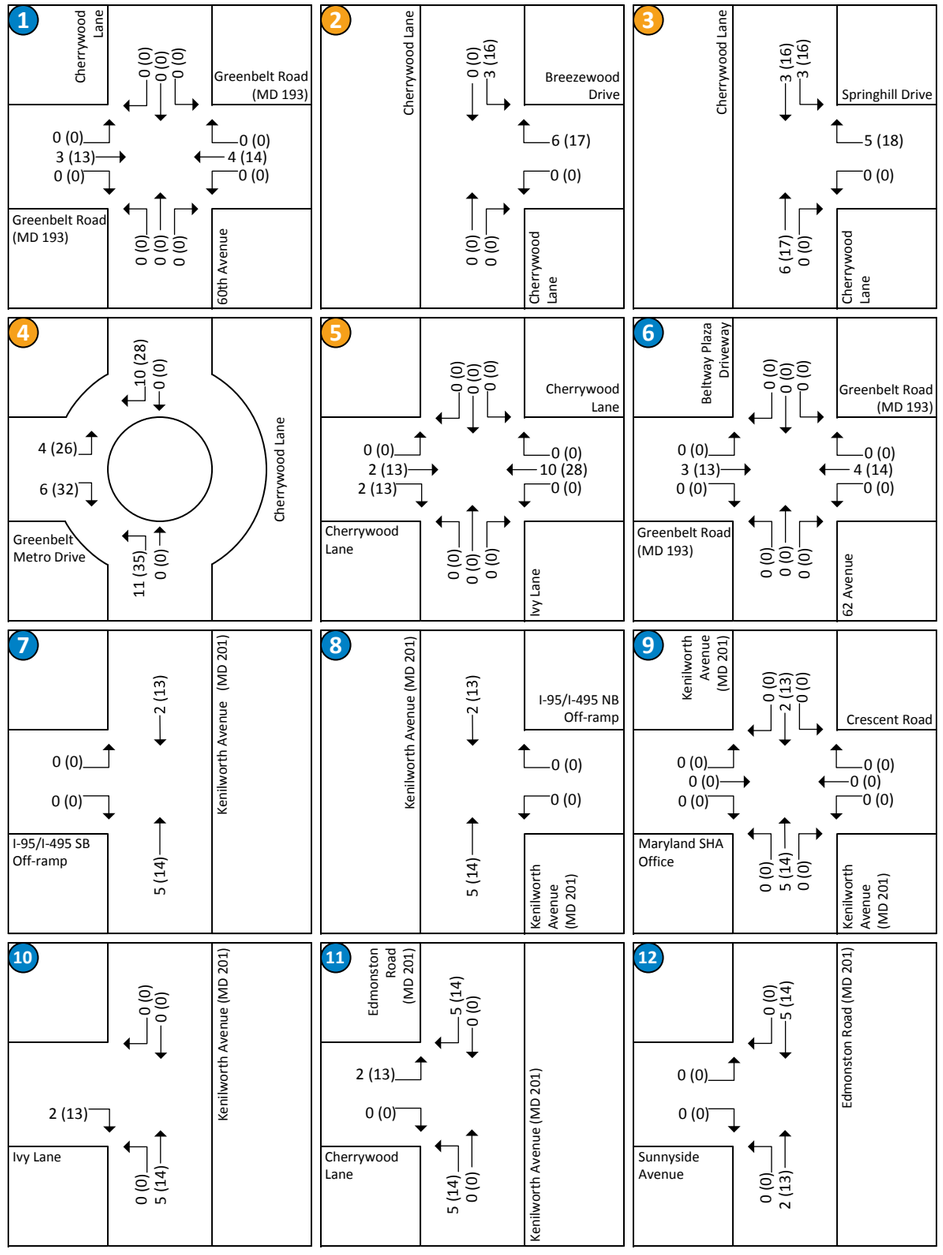
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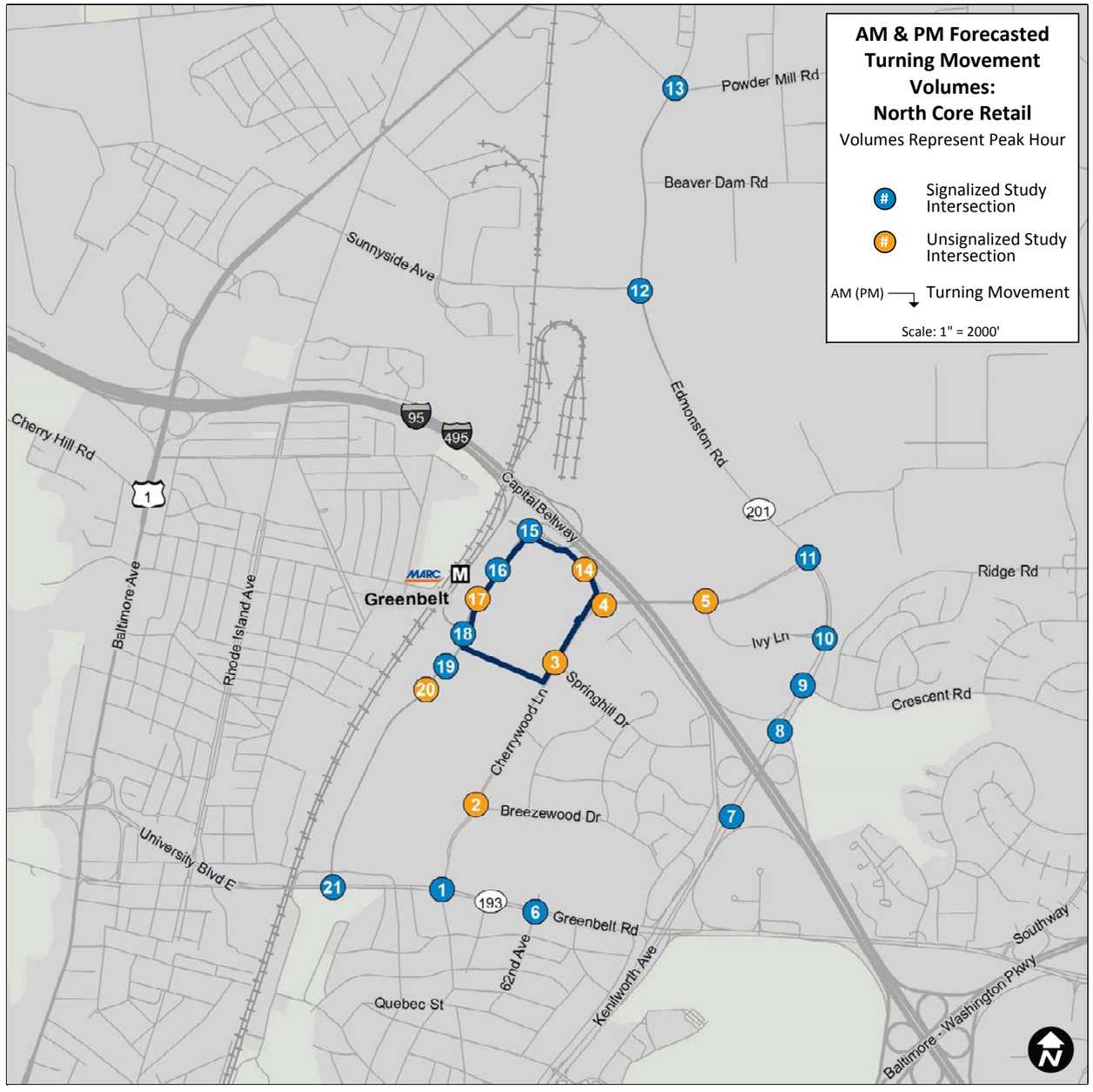
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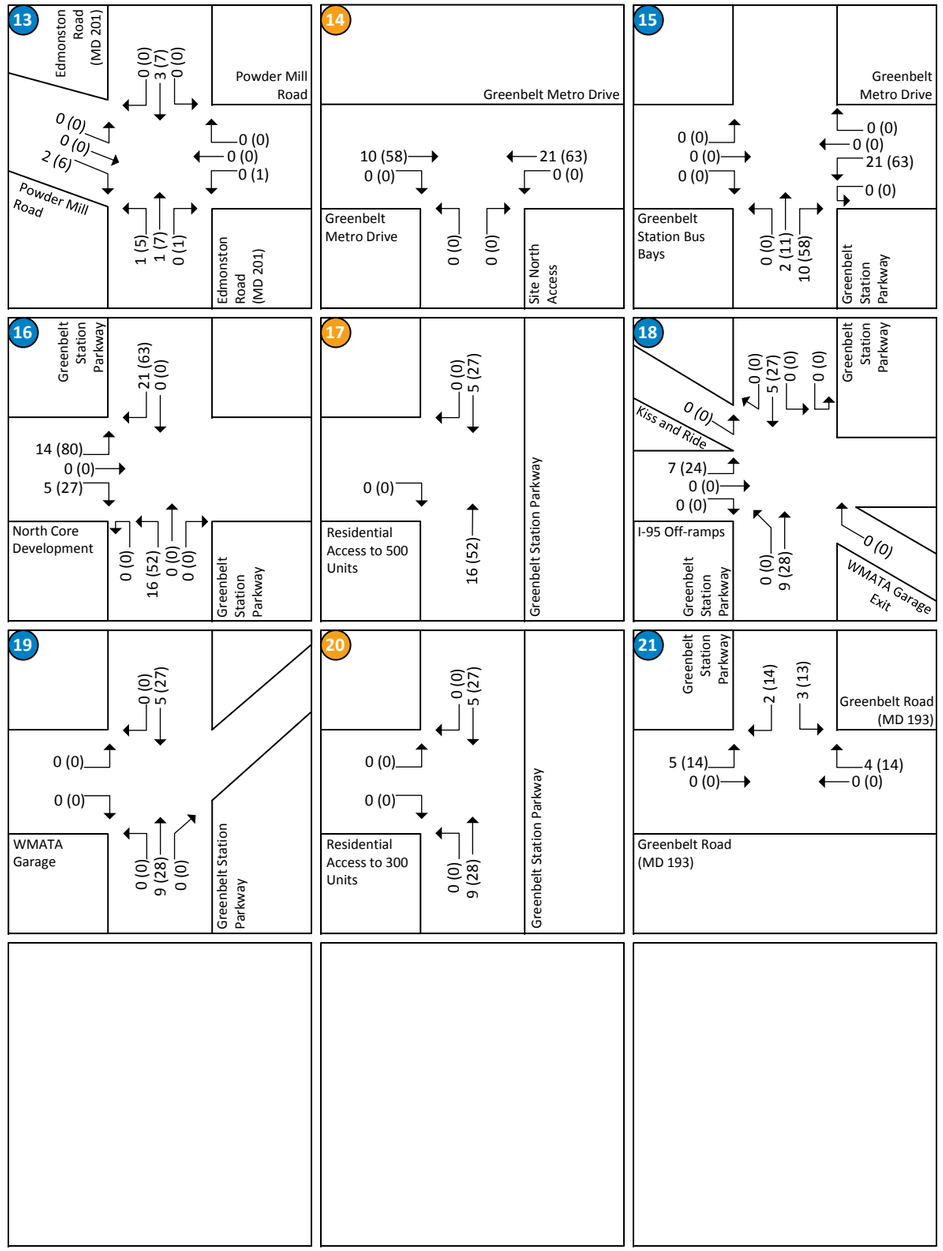
Baltimore - Washington Pkwy
95
495
1
201
193
MARC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Edmonston Road (MD 201)
Powder Mill Road
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Powder Mill Road
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Edmonston Road (MD 201)
14
Greenbelt Metro Drive
10 (58)
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21 (63)
0 (0)
Greenbelt Metro Drive
0 (0)
0 (0)
Site North Access
15
Greenbelt Metro Drive
0 (0)
0 (0)
21 (63)
0 (0)
0 (0)
0 (0)
0 (0)
Greenbelt Station Bus Bays
0 (0)
2 (11)
10 (58)
Greenbelt Station Parkway
16
Greenbelt Station Parkway
21 (63)
0 (0)
14 (80)
0 (0)
5 (27)
North Core Development
0 (0)
16 (52)
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0 (0)
Greenbelt Station Parkway
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5 (27)
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Residential Access to 500 Units
16 (52)
Greenbelt Station Parkway
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0 (0)
5 (27)
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Greenbelt Station Parkway
0 (0)
Kiss and Ride
7 (24)
0 (0)
0 (0)
I-95 Off-ramps
Greenbelt Station Parkway
0 (0)
9 (28)
0 (0)
WMATA Garage Exit
19
0 (0)
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WMATA Garage
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9 (28)
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Greenbelt Station Parkway
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0 (0)
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Residential Access to 300 Units
0 (0)
9 (28)
Greenbelt Station Parkway
21
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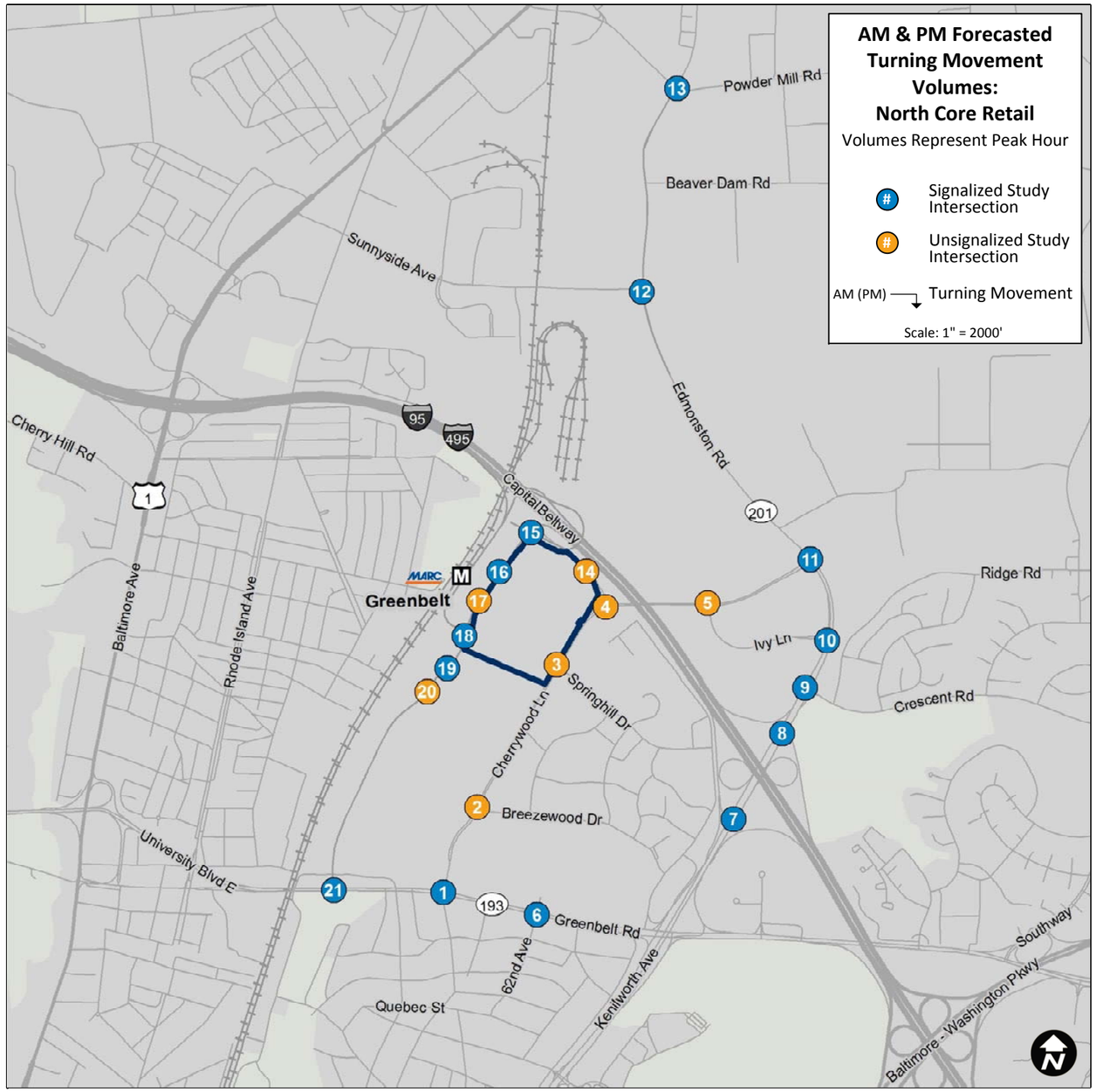
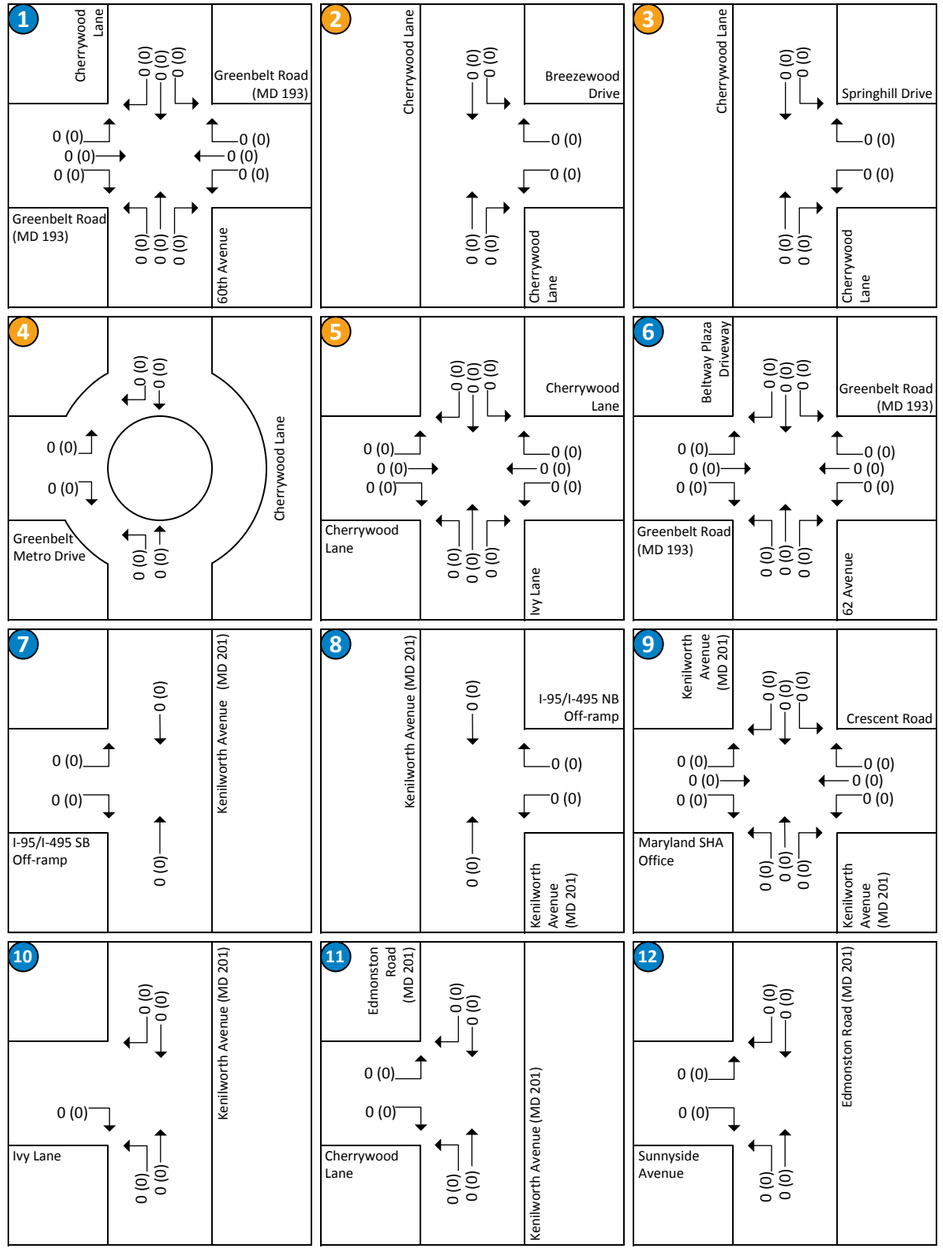

AM & PM Forecasted Turning Movement Volumes:
North Core Retail
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
95
495
Capital Beltway
201
Baltimore Ave
Rhode Island Ave
MARC
Greenbelt
Ridge Rd
Ivy Ln
Springhill Dr
Cherrywood Ln
Crescent Rd
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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Greenbelt Road (MD 193)
60th Avenue
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Cherrywood Lane
Breezewood Drive
Cherrywood Lane
3
Cherrywood Lane
Springhill Drive
Cherrywood Lane
4
Cherrywood Lane
Greenbelt Metro Drive
5
Cherrywood Lane
Cherrywood Lane
Ivy Lane
6
Beltway Plaza Driveway
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)
62 Avenue
7
Kenilworth Avenue (MD 201)
I-95/I-495 SB Off-ramp
Kenilworth Avenue (MD 201)
8
Kenilworth Avenue (MD 201)
I-95/I-495 NB Off-ramp
Kenilworth Avenue (MD 201)
9
Kenilworth Avenue (MD 201)
Crescent Road
Maryland SHA Office
Kenilworth Avenue (MD 201)
10
Kenilworth Avenue (MD 201)
Ivy Lane
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Cherrywood Lane
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Edmonston Road (MD 201)
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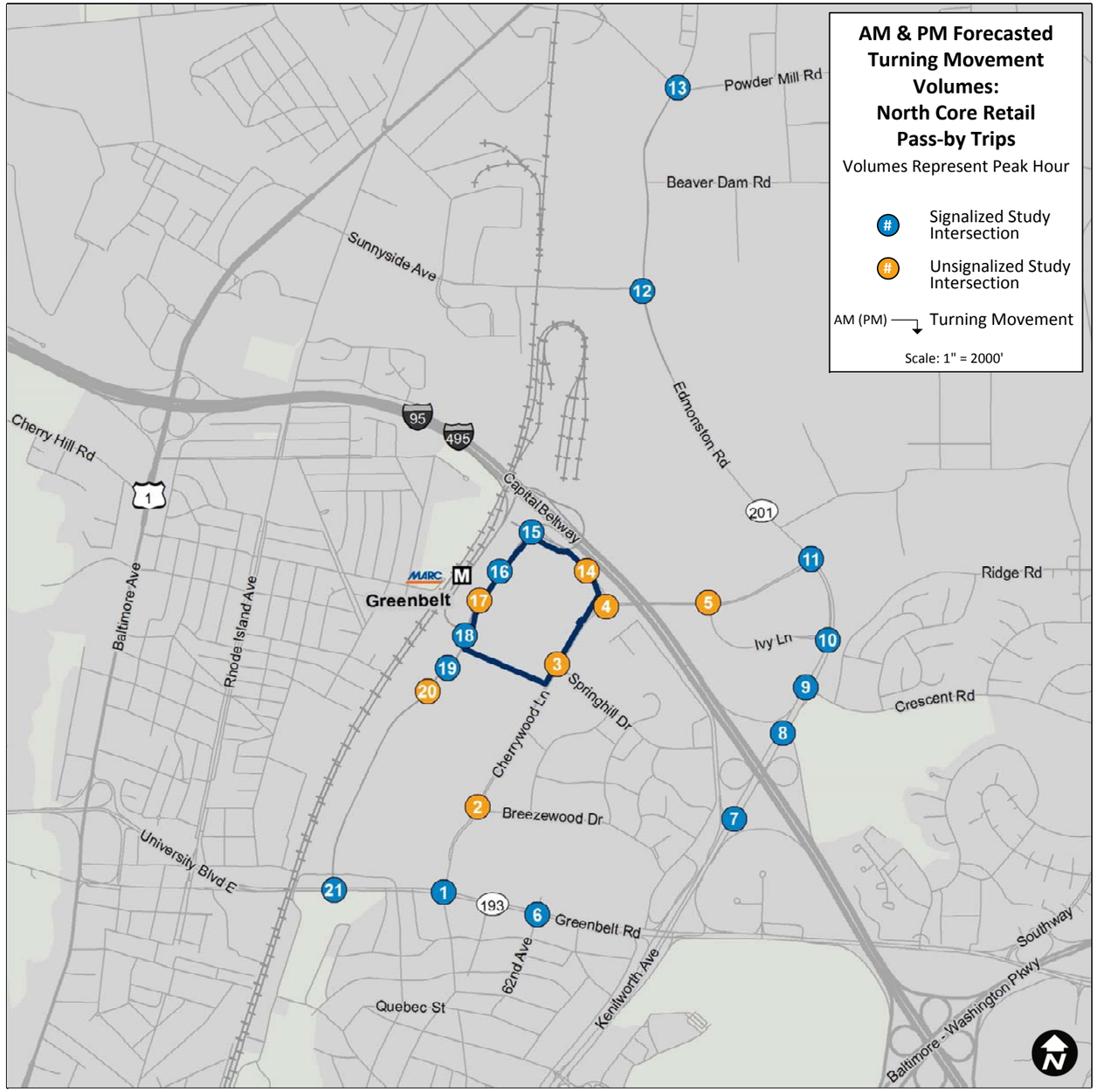
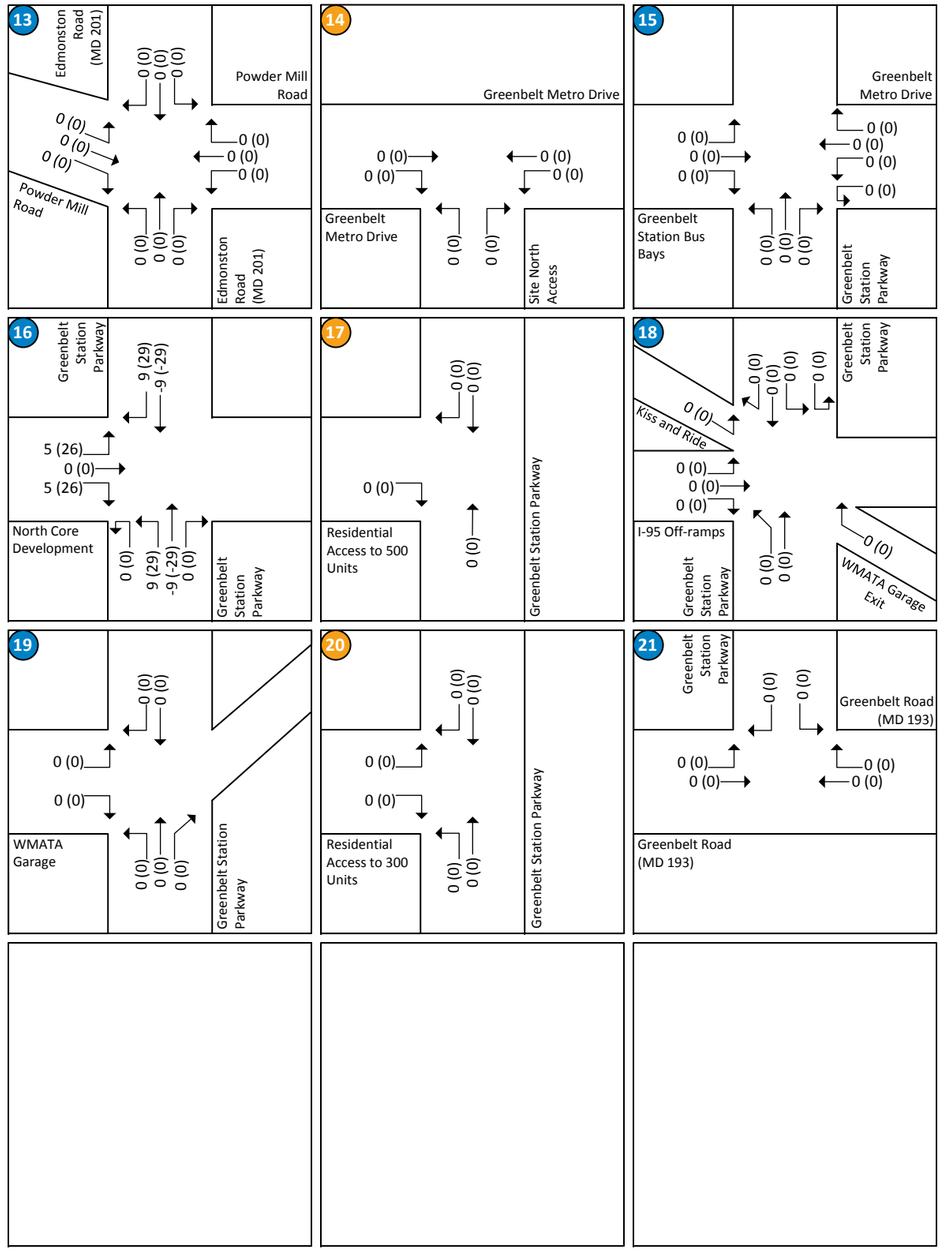

AM & PM Forecasted Turning Movement Volumes: North Core Retail Pass-by Trips
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
Capital Beltway
95
495
201
Ridge Rd
Greenbelt
MARC
Baltimore Ave
Rhode Island Ave
Ivy Ln
Crescent Rd
Cherrywood Ln
Springhill Dr
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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Edmonston Road (MD 201)
Powder Mill Road
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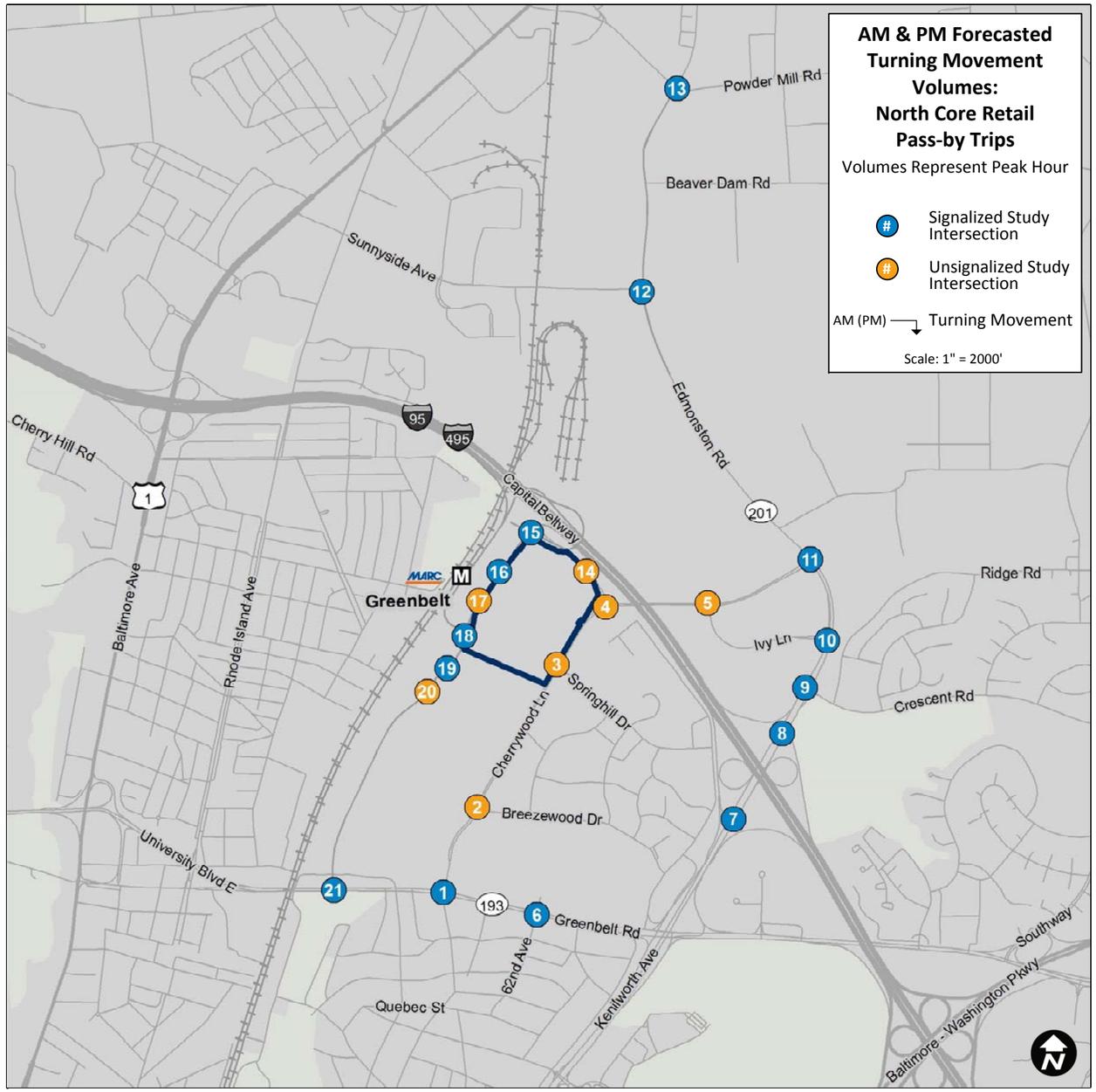
Powder Mill Road
Edmonston Road (MD 201)
14
Greenbelt Metro Drive
Greenbelt Metro Drive
Site North Access
15
Greenbelt Metro Drive
Greenbelt Station Bus Bays
Greenbelt Station Parkway
16
Greenbelt Station Parkway
9 (29)
-9 (-29)
5 (26)
North Core Development
Greenbelt Station Parkway
17
Residential Access to 500 Units
Greenbelt Station Parkway
18
Greenbelt Station Parkway
Kiss and Ride
I-95 Off-ramps
Greenbelt Station Parkway
WMATA Garage Exit
19
WMATA Garage
Greenbelt Station Parkway
20
Residential Access to 300 Units
Greenbelt Station Parkway
21
Greenbelt Station Parkway
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)


AM & PM Forecasted Turning Movement Volumes: North Core Retail Pass-by Trips
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Cherry Hill Rd
Edmonston Rd
Capital Beltway
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
University Blvd E
Greenbelt
Greenbelt Rd
Baltimore Ave
Rhode Island Ave
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy
MARC
95
495
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201
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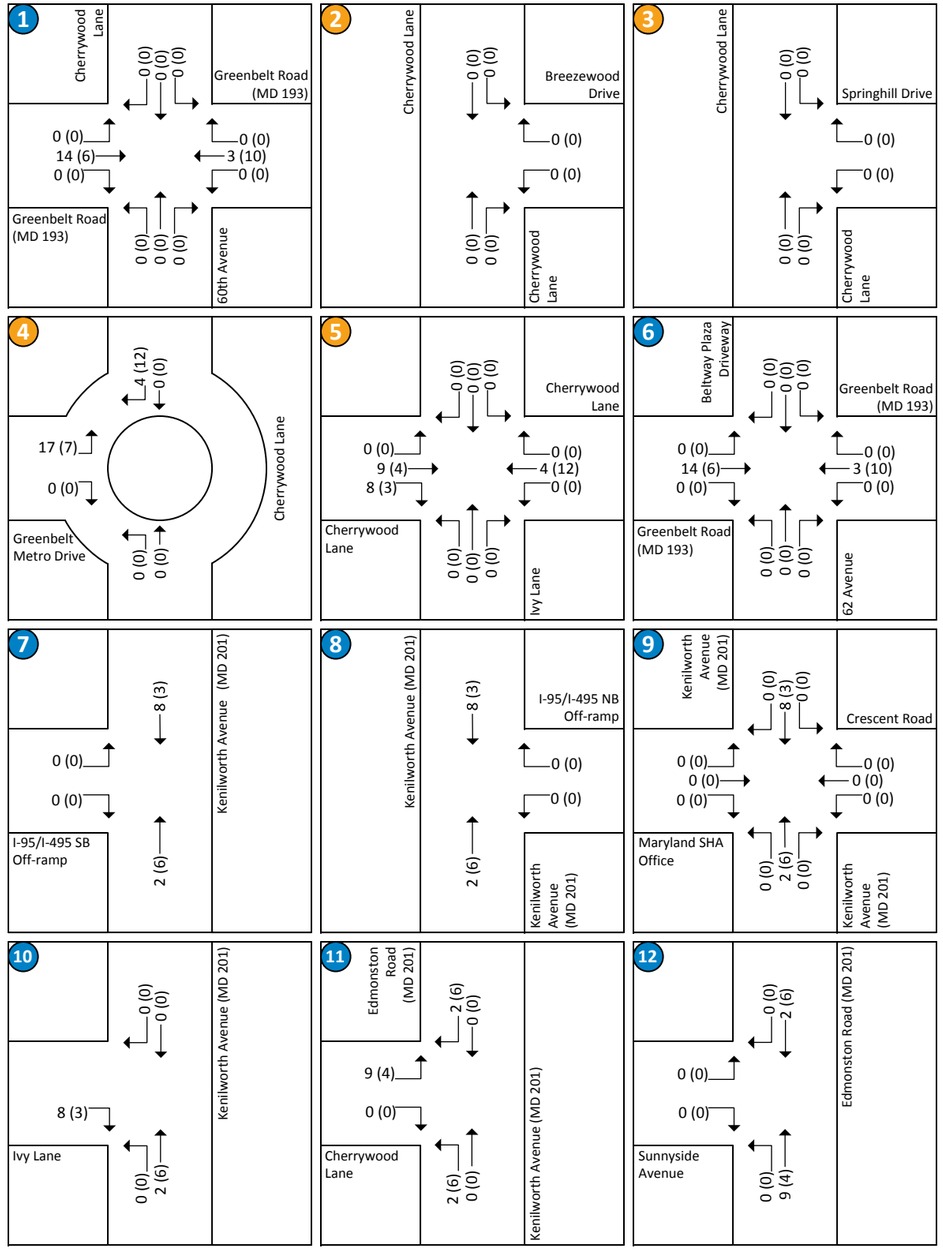
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Cherrywood Lane
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60th Avenue
2
Cherrywood Lane
Breezewood Drive
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Cherrywood Lane
3
Cherrywood Lane
Springhill Drive
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Cherrywood Lane
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Cherrywood Lane
Greenbelt Metro Drive
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Cherrywood Lane
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Ivy Lane
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Beltway Plaza Driveway
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62 Avenue
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Kenilworth Avenue (MD 201)
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I-95/I-495 SB Off-ramp
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Kenilworth Avenue (MD 201)
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I-95/I-495 NB Off-ramp
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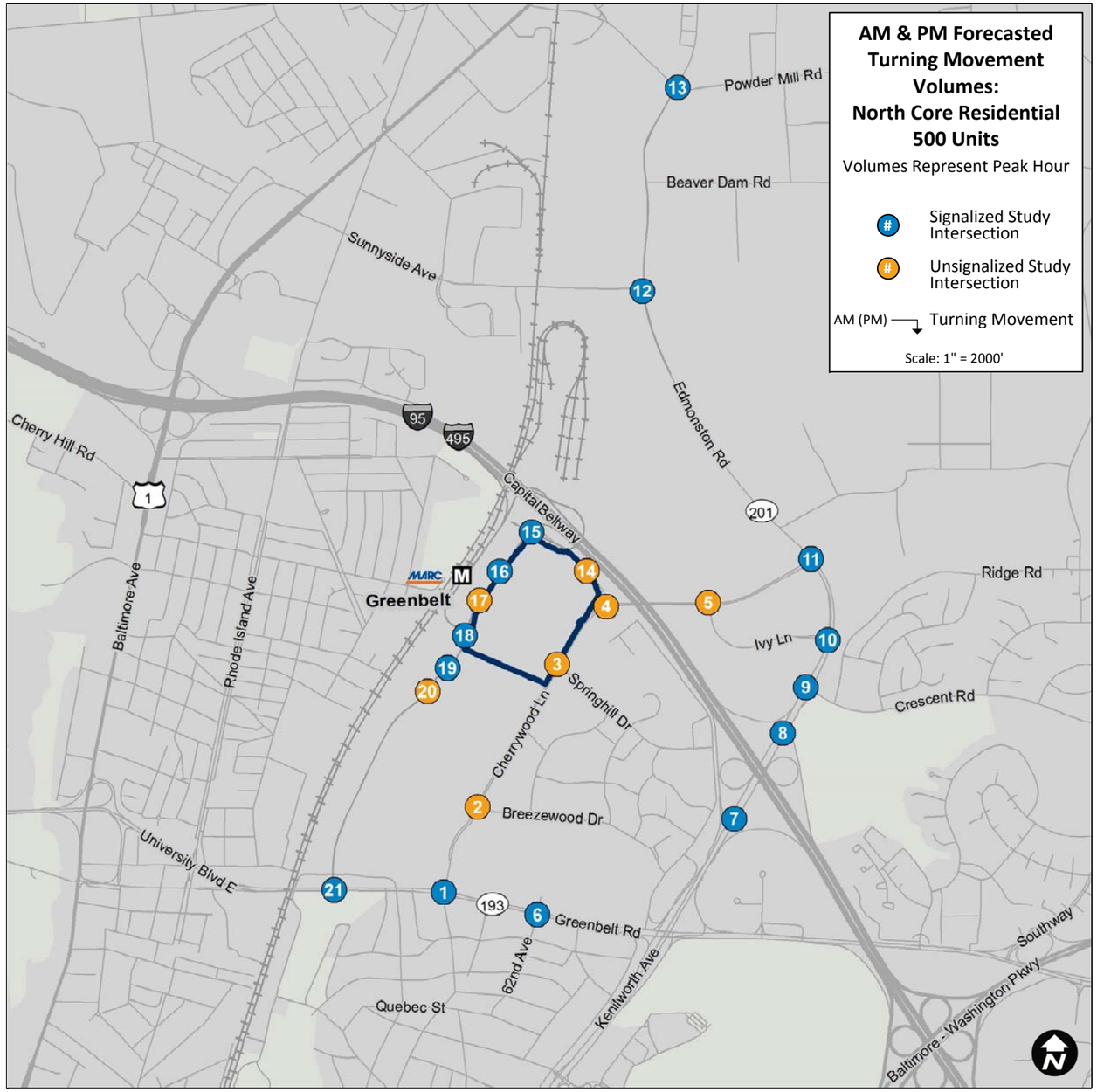
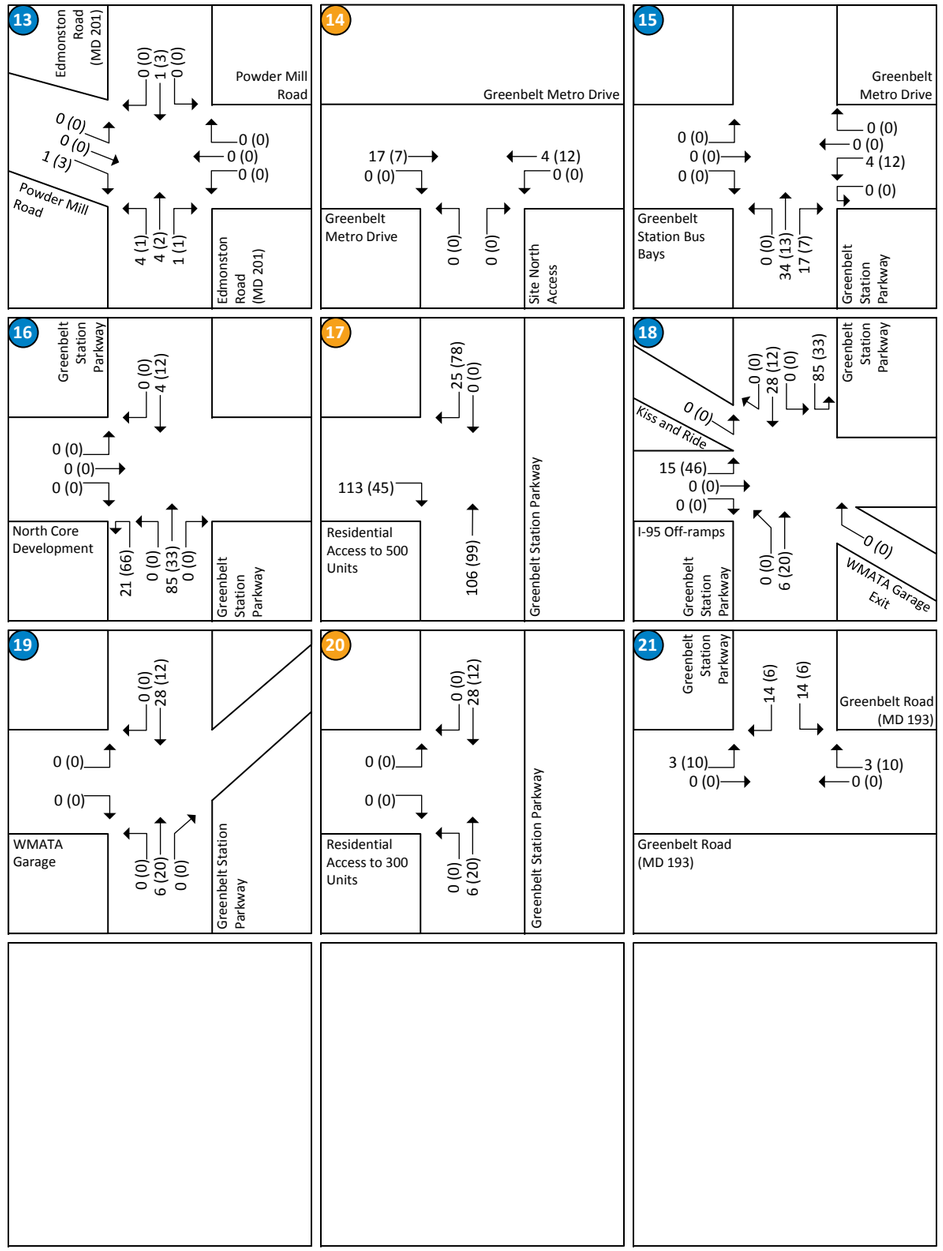

AM & PM Forecasted Turning Movement Volumes:
North Core Residential
500 Units
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
Capital Beltway
95
495
201
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
Greenbelt
MARC
Baltimore Ave
Rhode Island Ave
University Blvd E
Quebec St
62nd Ave
Kenilworth Ave
Greenbelt Rd
193
Southway
Baltimore - Washington Pkwy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Edmonston Road (MD 201)
Powder Mill Road
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Powder Mill Road
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Edmonston Road (MD 201)
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Greenbelt Metro Drive
17 (7)
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Greenbelt Metro Drive
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Site North Access
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Greenbelt Metro Drive
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4 (12)
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Greenbelt Station Bus Bays
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Greenbelt Station Parkway
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Greenbelt Station Parkway
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North Core Development
21 (66)
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85 (33)
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Greenbelt Station Parkway
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25 (78)
0 (0)
113 (45)
Residential Access to 500 Units
106 (99)
Greenbelt Station Parkway
18
0 (0)
28 (12)
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85 (33)
Greenbelt Station Parkway
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Kiss and Ride
15 (46)
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I-95 Off-ramps
Greenbelt Station Parkway
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WMATA Garage Exit
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WMATA Garage
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Greenbelt Station Parkway
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Residential Access to 300 Units
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6 (20)
Greenbelt Station Parkway
21
Greenbelt Station Parkway
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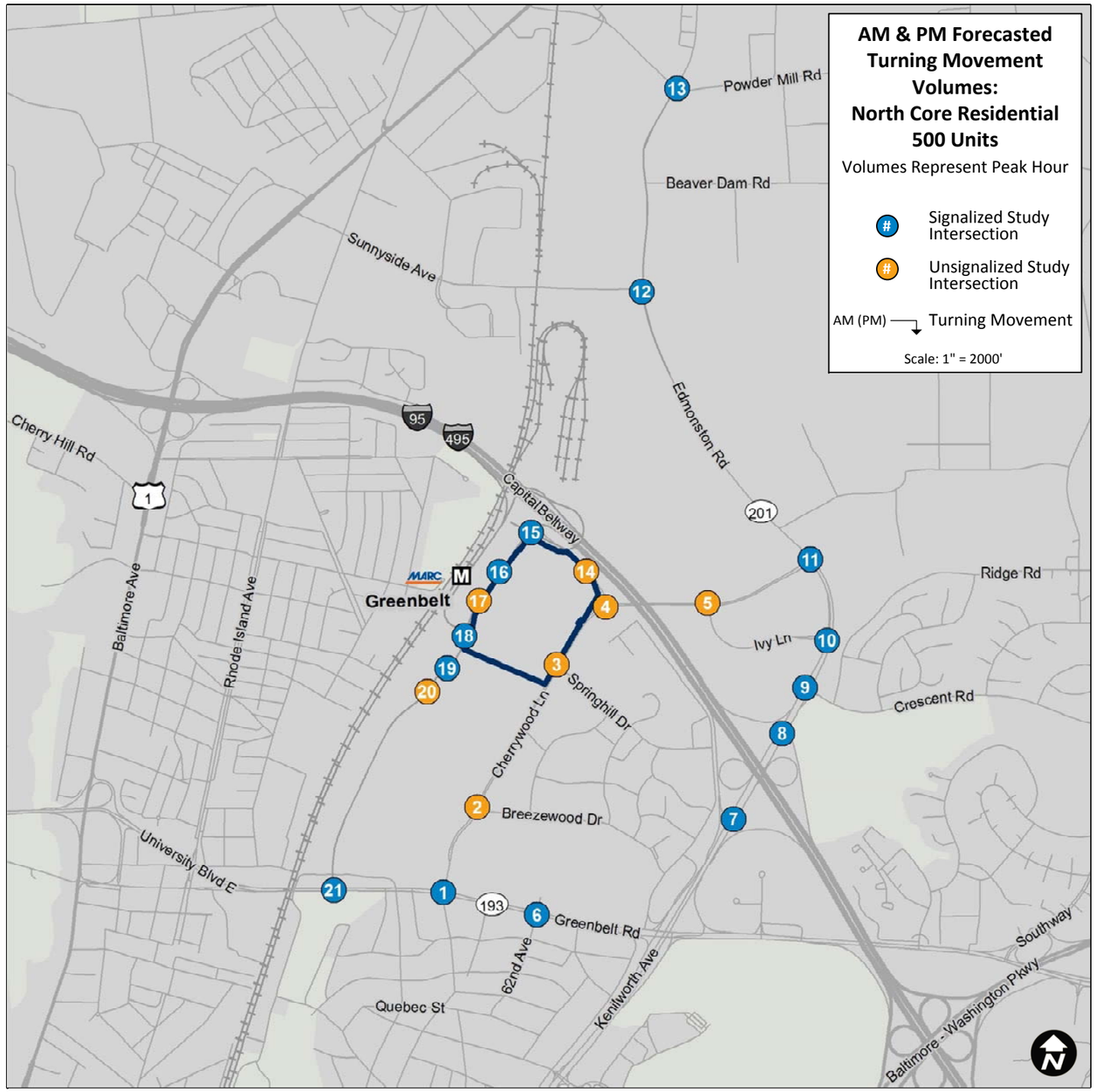
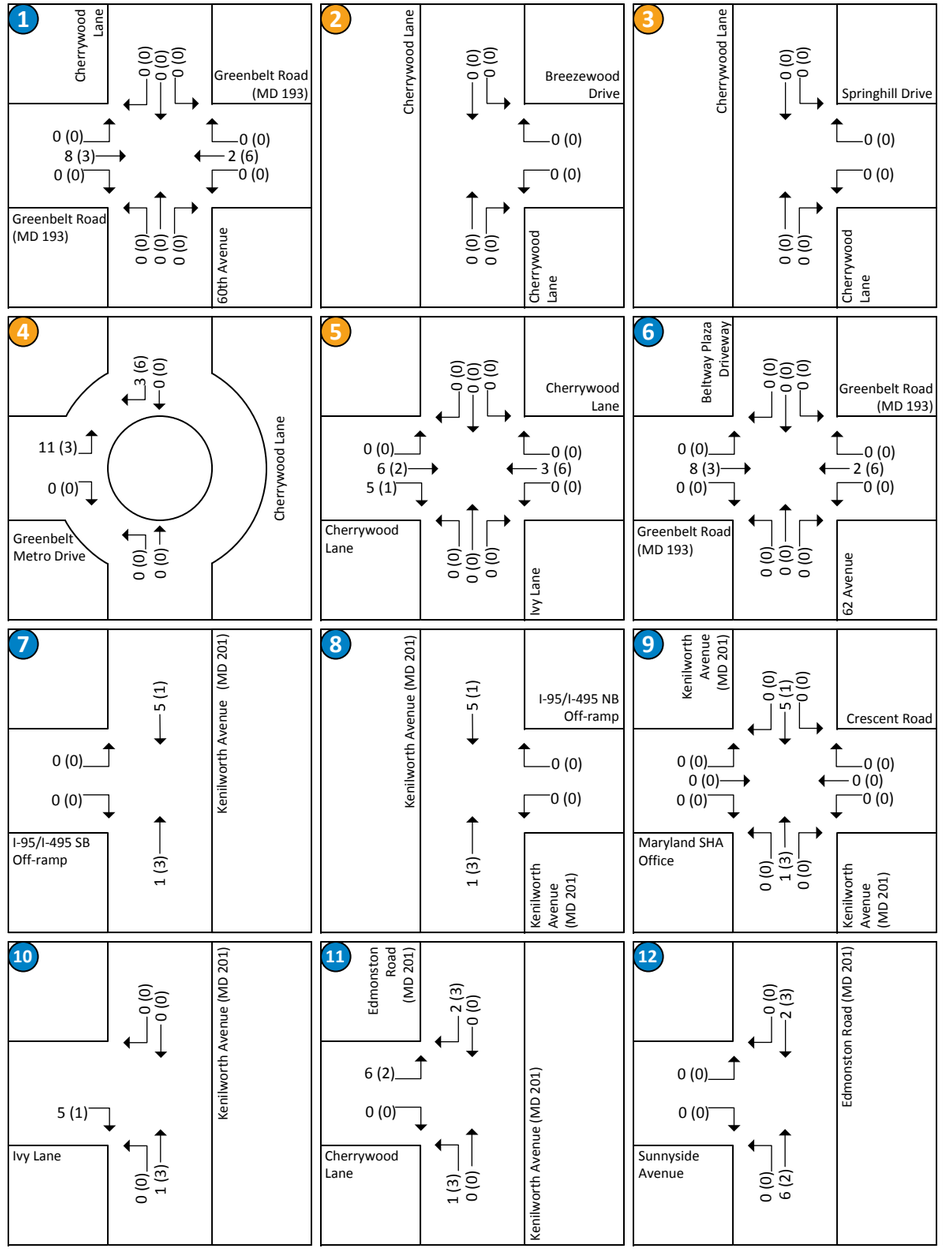

AM & PM Forecasted Turning Movement Volumes:
North Core Residential
500 Units
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
95
495
Capital Beltway
1
201
Baltimore Ave
Rhode Island Ave
MARC
M
Greenbelt
Ridge Rd
Ivy Ln
Springhill Dr
Cherrywood Ln
Crescent Rd
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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60th Avenue
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Cherrywood Lane
Breezewood Drive
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Cherrywood Lane
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Cherrywood Lane
Springhill Drive
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Cherrywood Lane
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Cherrywood Lane
Greenbelt Metro Drive
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Cherrywood Lane
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Cherrywood Lane
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Ivy Lane
6
Beltway Plaza Driveway
Greenbelt Road (MD 193)
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Greenbelt Road (MD 193)
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62 Avenue
7
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I-95/I-495 SB Off-ramp
Kenilworth Avenue (MD 201)
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I-95/I-495 NB Off-ramp
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Crescent Road
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Maryland SHA Office
Kenilworth Avenue (MD 201)
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Kenilworth Avenue (MD 201)
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Edmonston Road (MD 201)
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Cherrywood Lane
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Kenilworth Avenue (MD 201)
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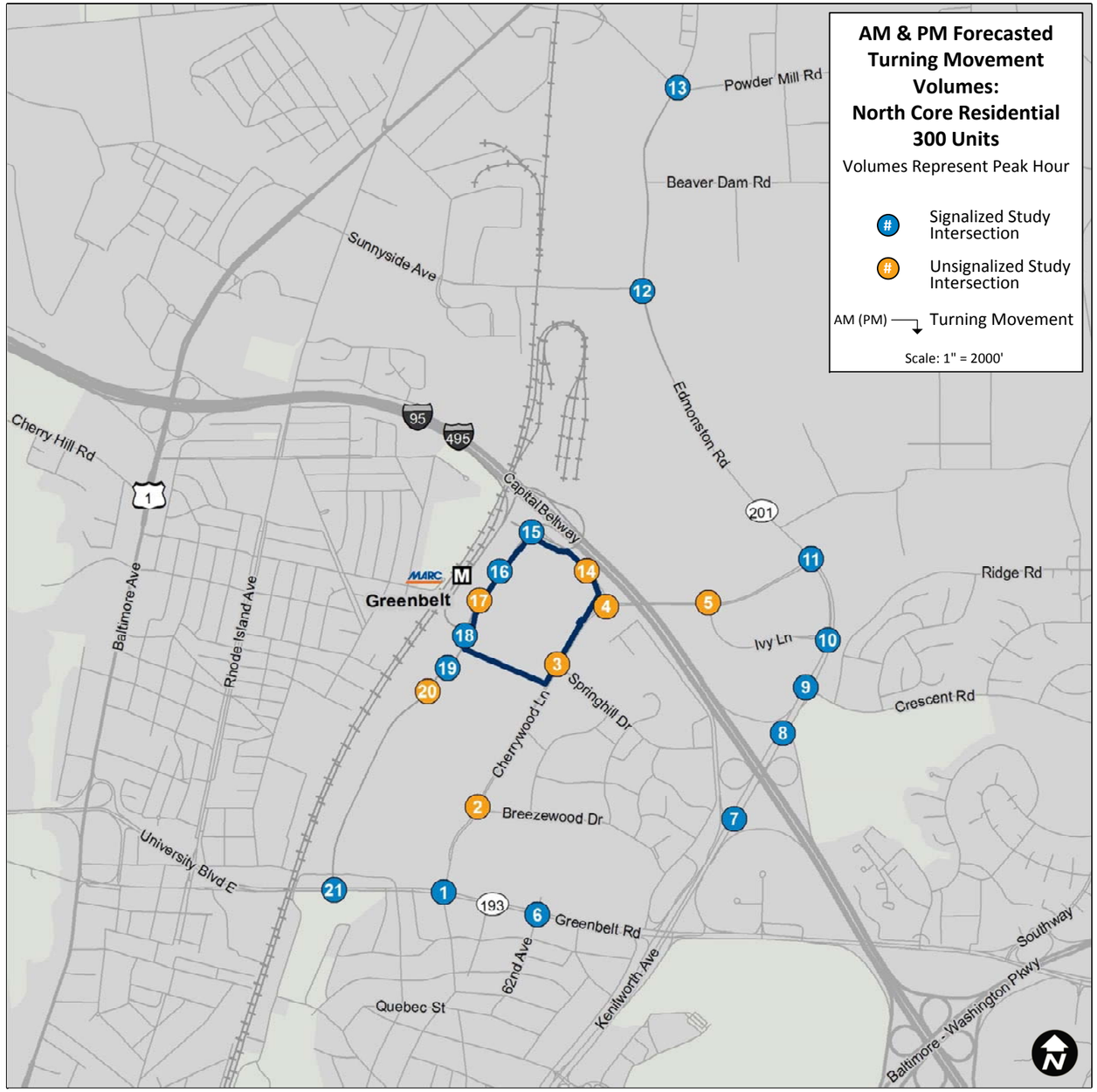
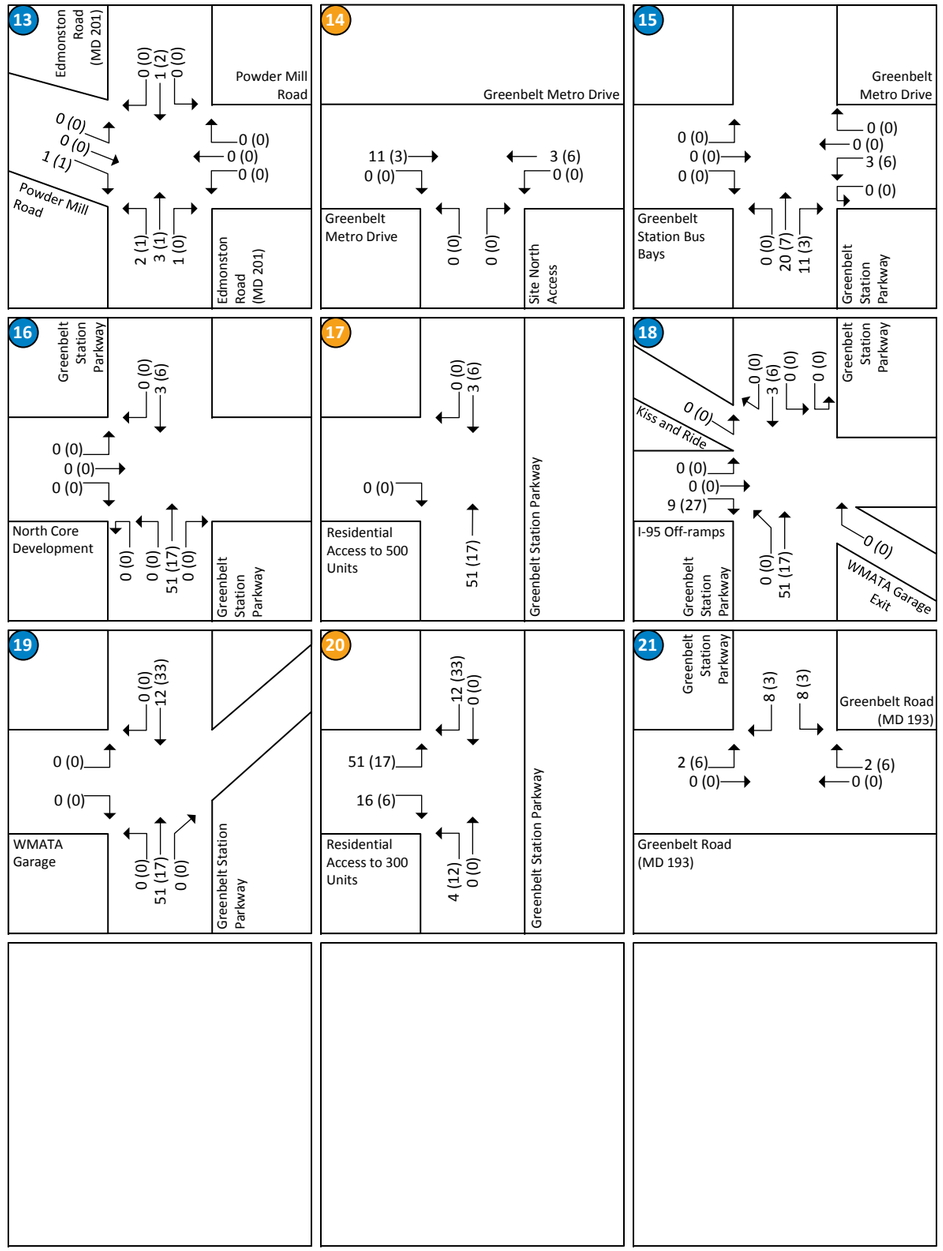
Edmonston Road (MD 201)


AM & PM Forecasted Turning Movement Volumes:
North Core Residential
300 Units
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
Capital Beltway
95
495
201
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
University Blvd E
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Baltimore Ave
Rhode Island Ave
Southway
Baltimore - Washington Pkwy
MARC
Greenbelt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Edmonston Road (MD 201)
Powder Mill Road
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1 (1)
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Powder Mill Road
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Edmonston Road (MD 201)
14
Greenbelt Metro Drive
11 (3)
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3 (6)
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Greenbelt Metro Drive
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Site North Access
15
Greenbelt Metro Drive
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Greenbelt Station Bus Bays
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Greenbelt Station Parkway
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Greenbelt Station Parkway
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North Core Development
0 (0)
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51 (17)
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Greenbelt Station Parkway
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Residential Access to 500 Units
51 (17)
Greenbelt Station Parkway
18
Greenbelt Station Parkway
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3 (6)
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0 (0)
Kiss and Ride
0 (0)
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I-95 Off-ramps
Greenbelt Station Parkway
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WMATA Garage
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Greenbelt Station Parkway
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12 (33)
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51 (17)
16 (6)
Residential Access to 300 Units
4 (12)
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Greenbelt Station Parkway
21
Greenbelt Station Parkway
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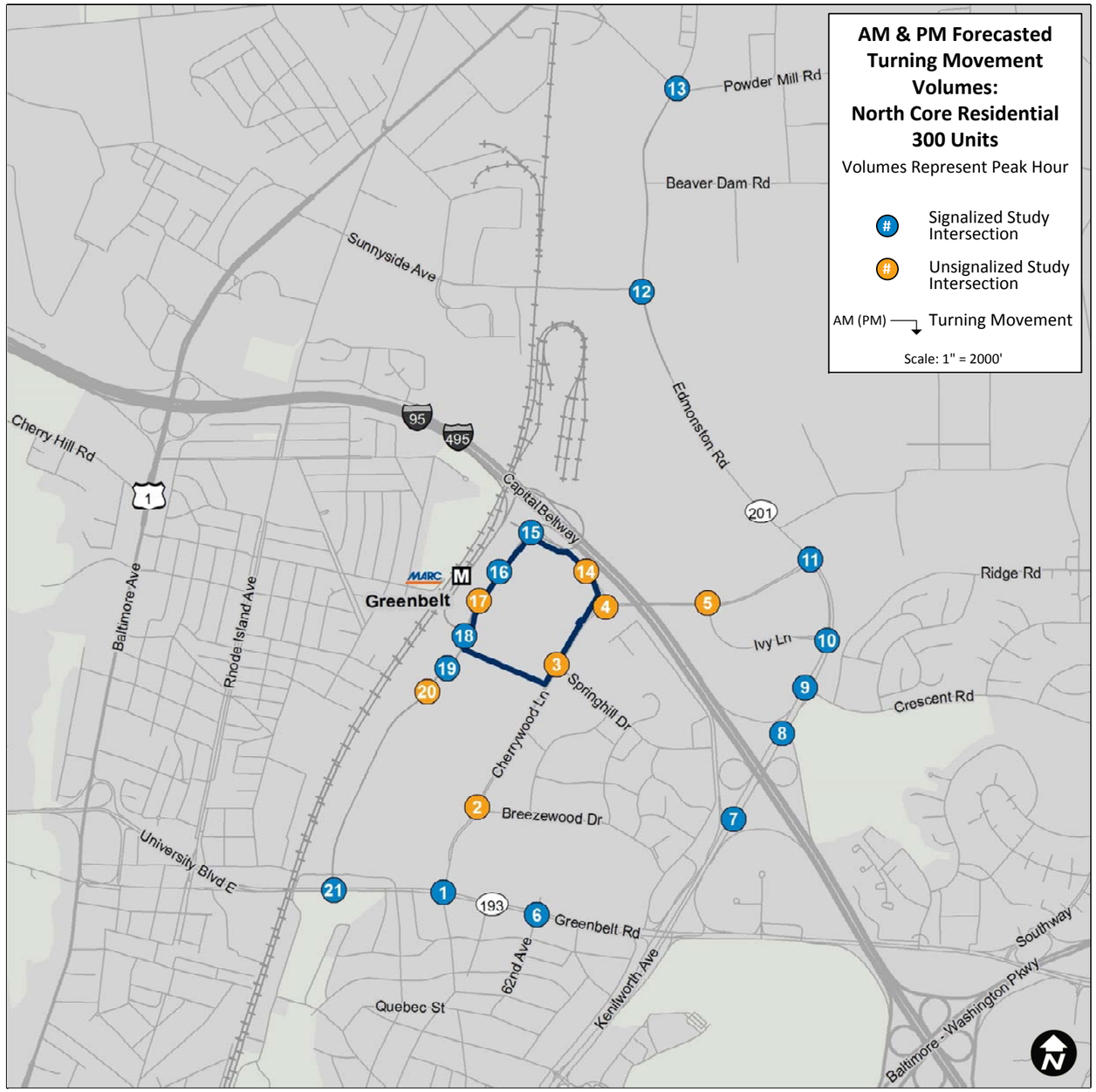
AM & PM Forecasted Turning Movement Volumes:
North Core Residential
300 Units
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
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495
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201
Capital Beltway
Baltimore Ave
Rhode Island Ave
MARC
Greenbelt
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
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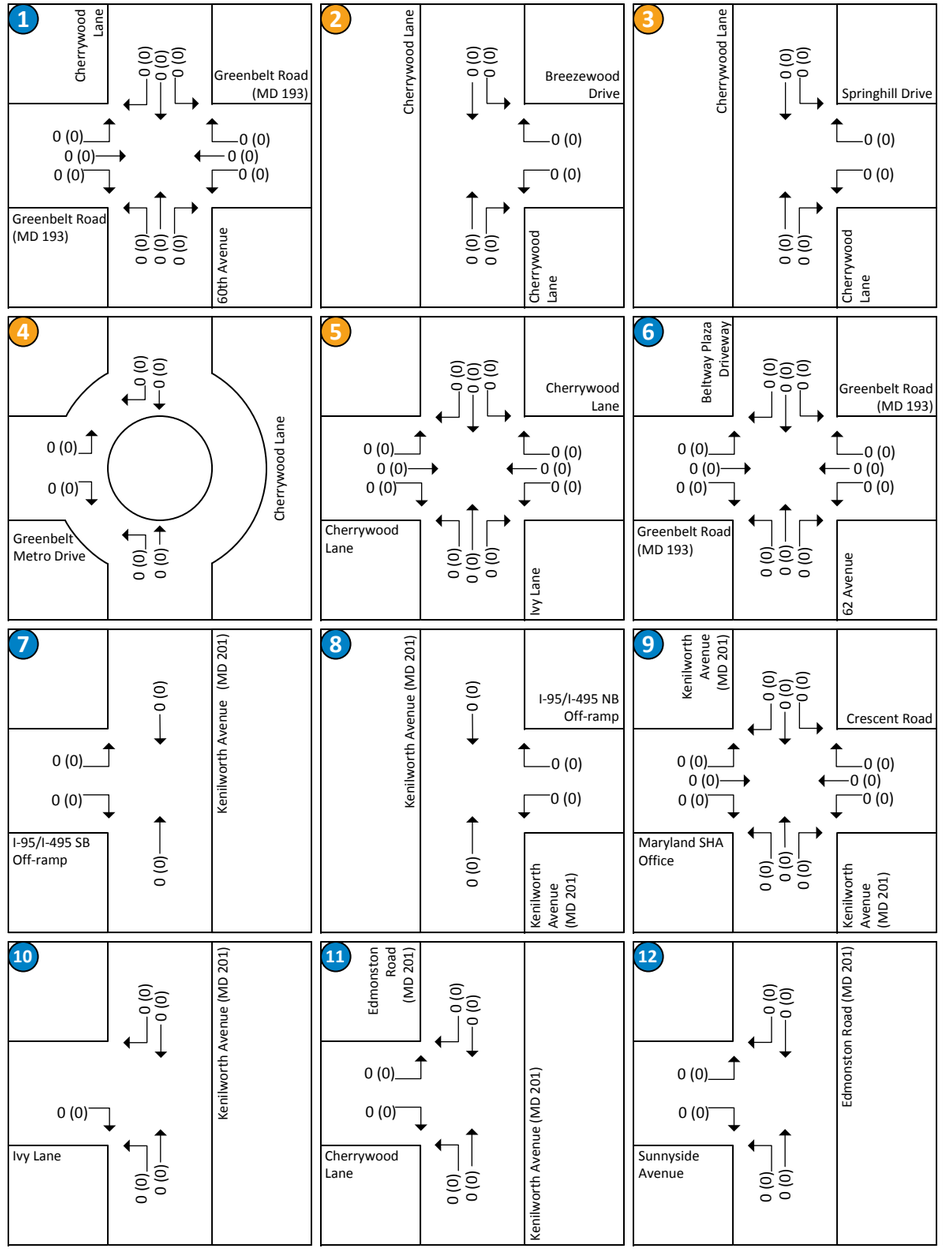
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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Greenbelt Road (MD 193)
Greenbelt Road (MD 193)
60th Avenue
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Cherrywood Lane
Breezewood Drive
Cherrywood Lane
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Cherrywood Lane
Springhill Drive
Cherrywood Lane
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Cherrywood Lane
Greenbelt Metro Drive
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Cherrywood Lane
Cherrywood Lane
Ivy Lane
6
Beltway Plaza Driveway
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)
62 Avenue
7
Kenilworth Avenue (MD 201)
I-95/I-495 SB Off-ramp
Kenilworth Avenue (MD 201)
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Kenilworth Avenue (MD 201)
I-95/I-495 NB Off-ramp
Kenilworth Avenue (MD 201)
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Kenilworth Avenue (MD 201)
Crescent Road
Maryland SHA Office
Kenilworth Avenue (MD 201)
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Kenilworth Avenue (MD 201)
Ivy Lane
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Kenilworth Avenue (MD 201)
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Edmonston Road (MD 201)
Sunnyside Avenue
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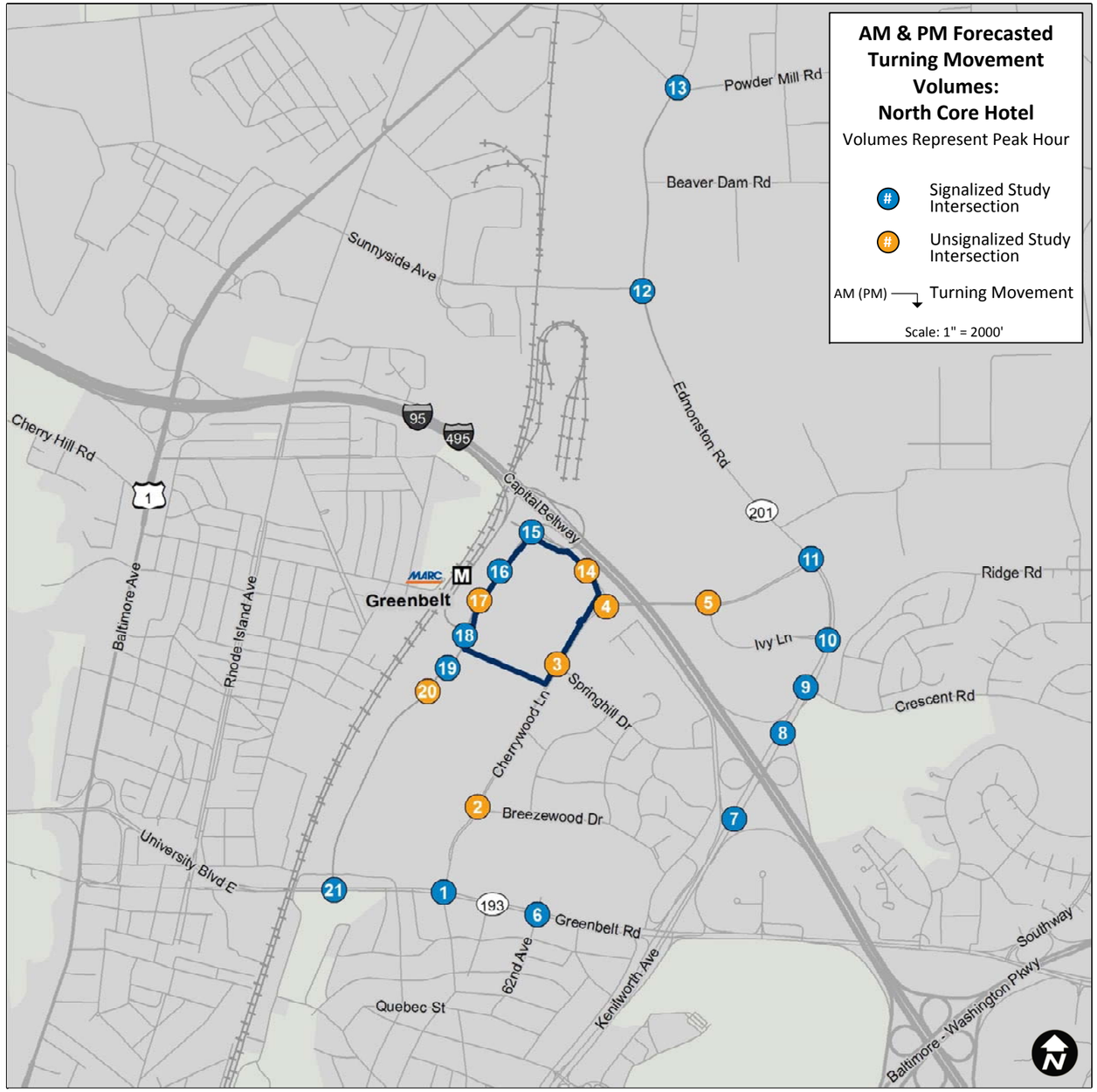
AM & PM Forecasted Turning Movement Volumes: North Core Hotel
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
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Capital Beltway
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Ridge Rd
Baltimore Ave
Rhode Island Ave
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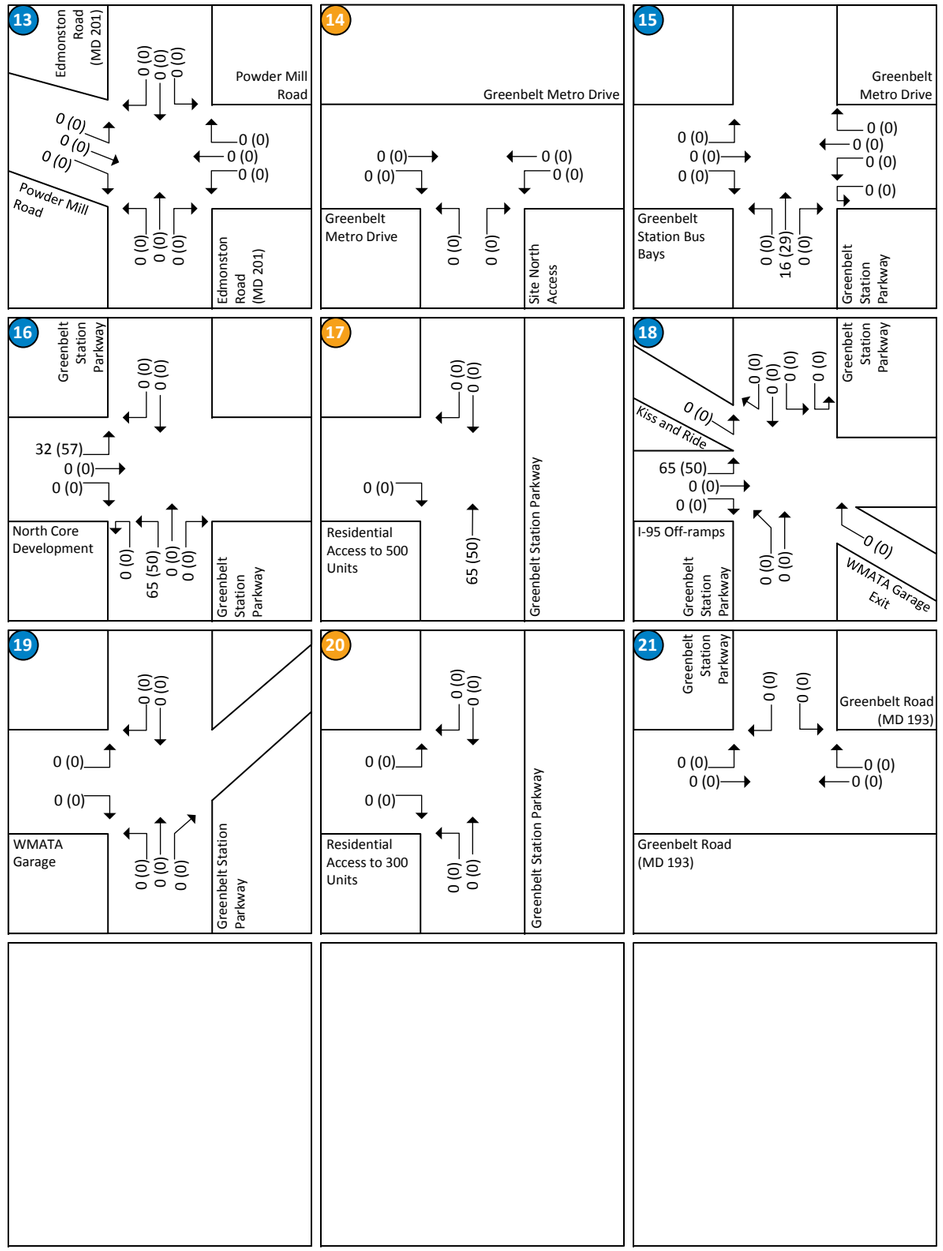
Crescent Rd
Cherrywood Ln
Springhill Dr
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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Edmonston Road (MD 201)
Powder Mill Road
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Powder Mill Road
Edmonston Road (MD 201)
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Greenbelt Metro Drive
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Greenbelt Metro Drive
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Site North Access
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Greenbelt Metro Drive
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0 (0)
Greenbelt Station Bus Bays
0 (0)
16 (29)
0 (0)
Greenbelt Station Parkway
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Greenbelt Station Parkway
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32 (57)
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0 (0)
North Core Development
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65 (50)
0 (0)
0 (0)
Greenbelt Station Parkway
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Residential Access to 500 Units
65 (50)
Greenbelt Station Parkway
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Greenbelt Station Parkway
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Kiss and Ride
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I-95 Off-ramps
Greenbelt Station Parkway
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WMATA Garage Exit
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WMATA Garage
Greenbelt Station Parkway
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Residential Access to 300 Units
Greenbelt Station Parkway
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Greenbelt Station Parkway
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Greenbelt Road (MD 193)
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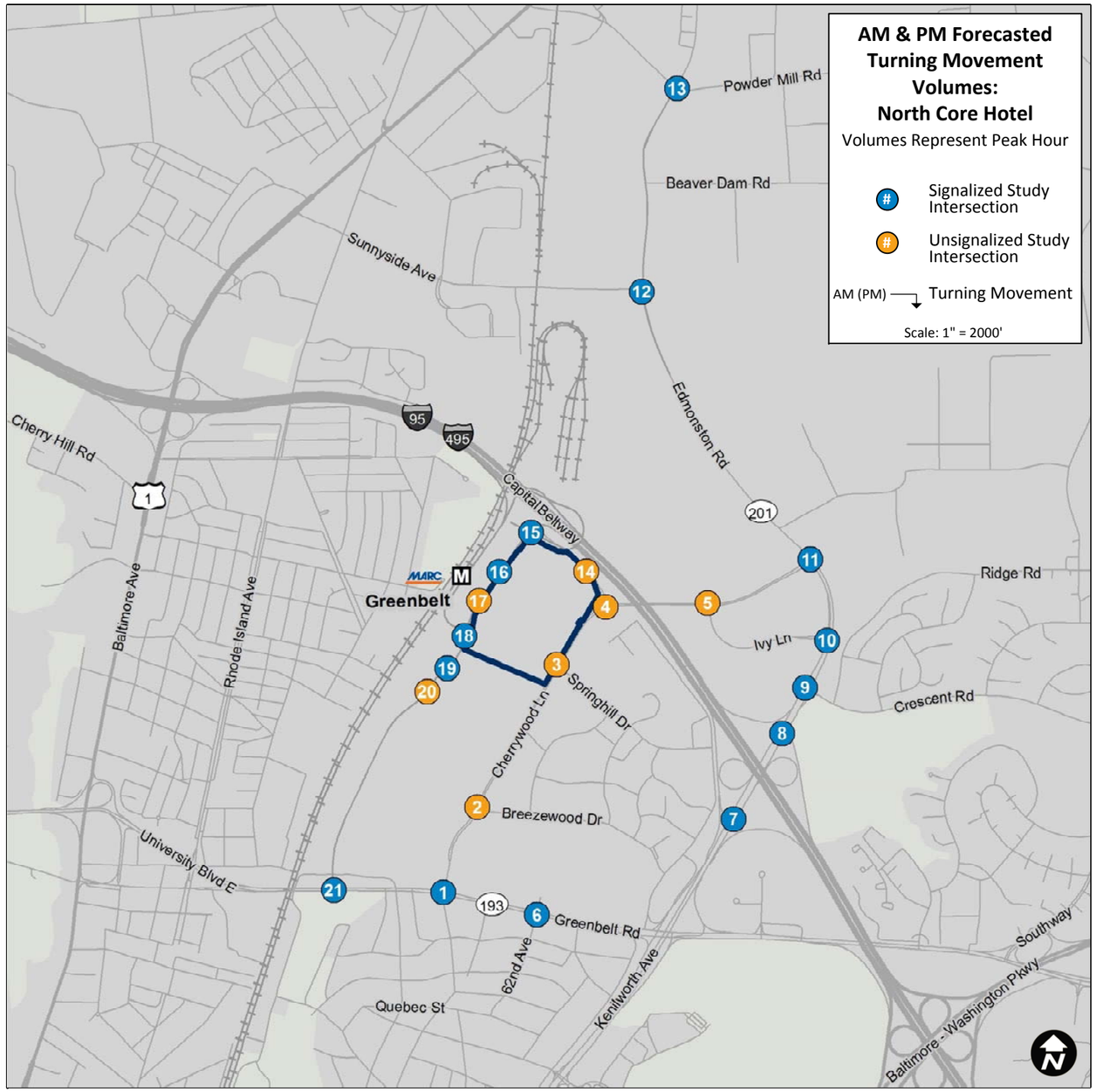
Greenbelt Road (MD 193)


AM & PM Forecasted Turning Movement Volumes:
North Core Hotel
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Cherry Hill Rd
Edmonston Rd
Capital Beltway
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
University Blvd E
Greenbelt
Greenbelt Rd
Baltimore Ave
Rhode Island Ave
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy
95
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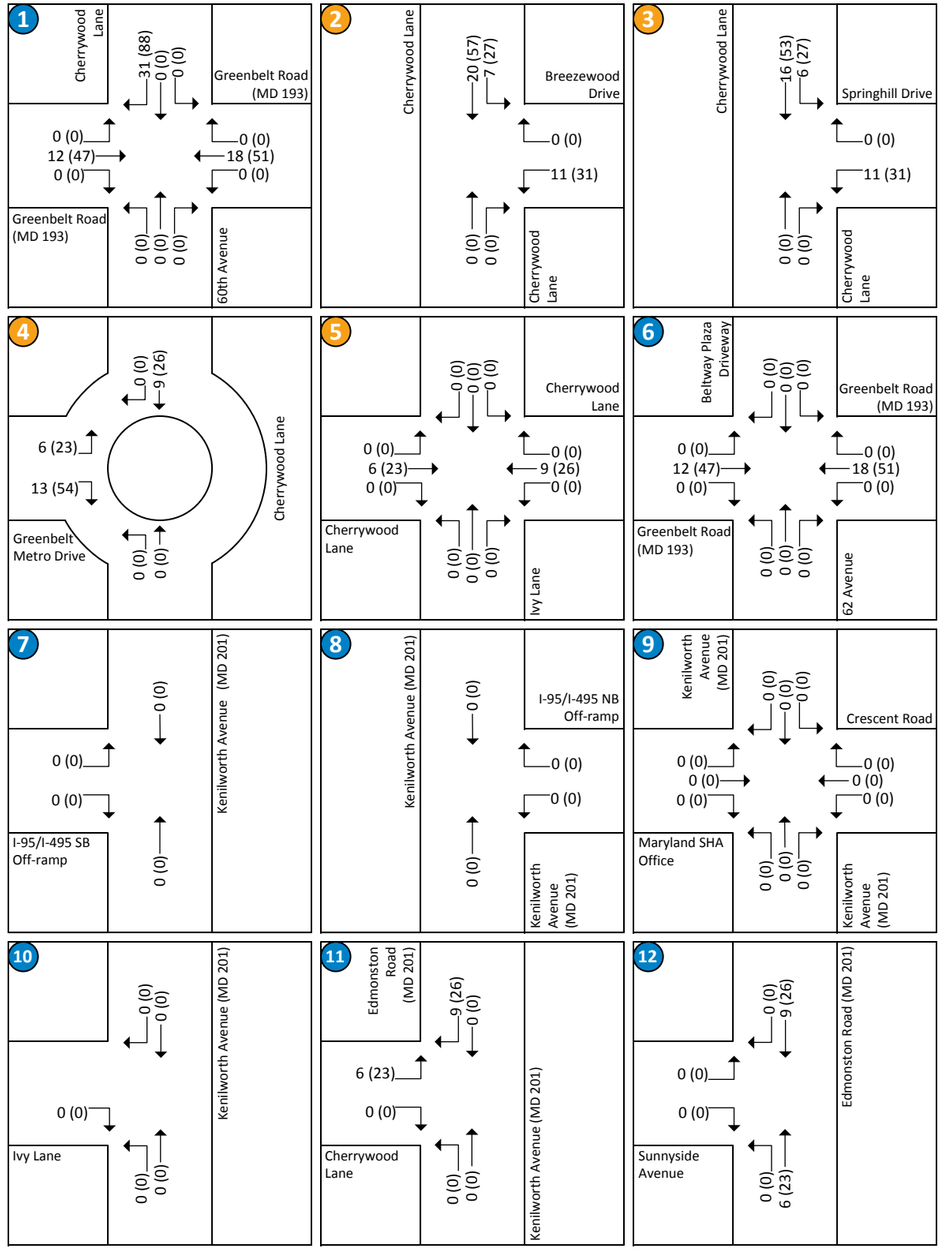
193
MARC
M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60th Avenue
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20 (57)
7 (27)
Breezewood Drive
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11 (31)
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Cherrywood Lane
3
Cherrywood Lane
16 (53)
6 (27)
Springhill Drive
0 (0)
11 (31)
0 (0)
0 (0)
Cherrywood Lane
4
0 (0)
9 (26)
6 (23)
13 (54)
Cherrywood Lane
Greenbelt Metro Drive
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Cherrywood Lane
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0 (0)
6 (23)
0 (0)
9 (26)
0 (0)
Cherrywood Lane
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0 (0)
Ivy Lane
6
Beltway Plaza Driveway
Greenbelt Road (MD 193)
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12 (47)
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18 (51)
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Greenbelt Road (MD 193)
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I-95/I-495 NB Off-ramp
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Kenilworth Avenue (MD 201)
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Kenilworth Avenue (MD 201)
6 (23)
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Cherrywood Lane
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9 (26)
Edmonston Road (MD 201)
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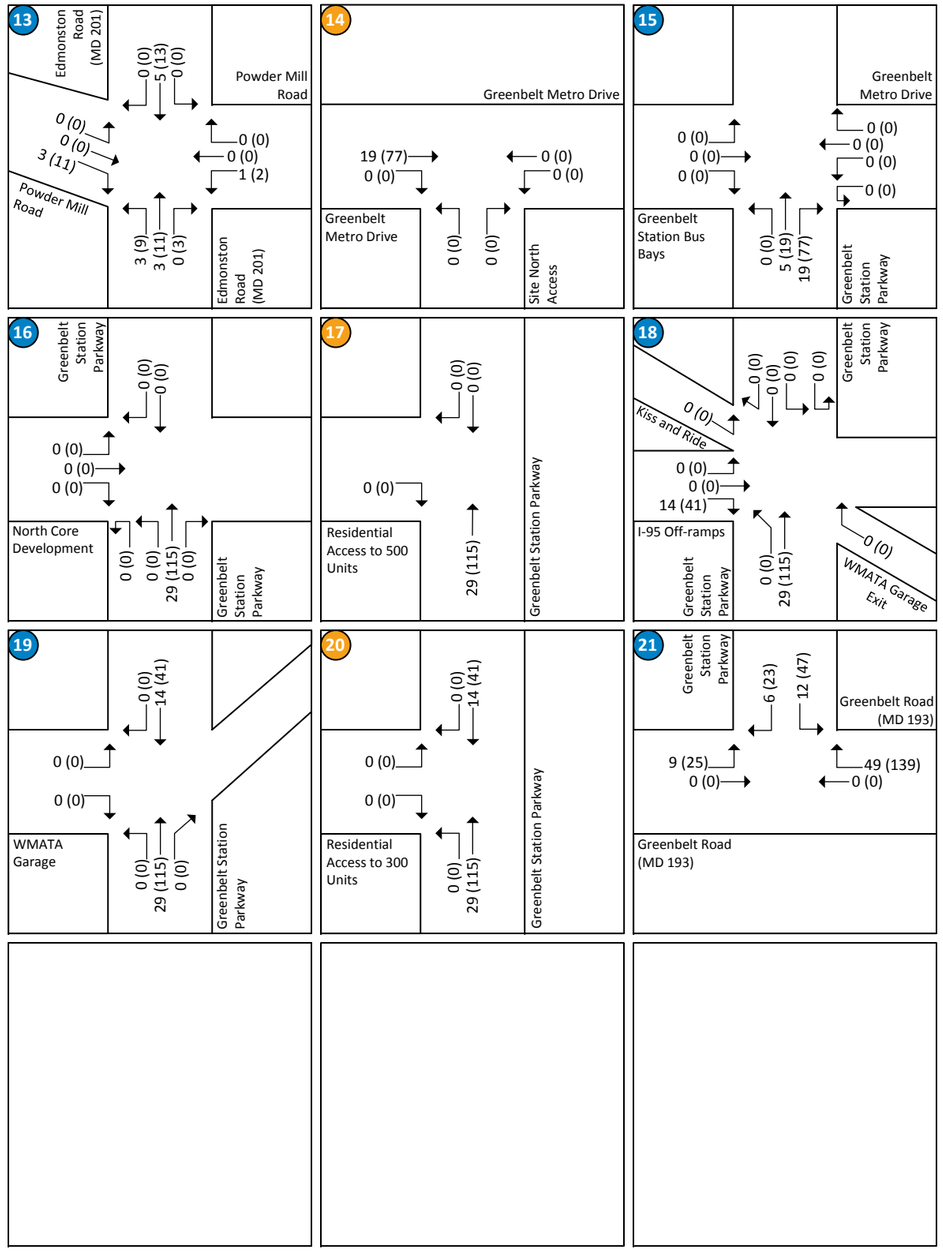
0 (0)
Sunnyside Avenue
0 (0)
6 (23)
AM & PM Forecasted Turning Movement Volumes: South Core Retail
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
95
495
Capital Beltway
201
Ridge Rd
Baltimore Ave
Rhode Island Ave
MARC
M
Greenbelt
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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Powder Mill Road
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1 (2)
Powder Mill Road
3 (9)
3 (11)
0 (3)
Edmonston Road (MD 201)
14
Greenbelt Metro Drive
19 (77)
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0 (0)
0 (0)
Greenbelt Metro Drive
0 (0)
0 (0)
Site North Access
15
Greenbelt Metro Drive
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
Greenbelt Station Bus Bays
0 (0)
5 (19)
19 (77)
Greenbelt Station Parkway
16
Greenbelt Station Parkway
0 (0)
0 (0)
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0 (0)
0 (0)
North Core Development
0 (0)
0 (0)
29 (115)
0 (0)
Greenbelt Station Parkway
17
0 (0)
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0 (0)
Residential Access to 500 Units
29 (115)
Greenbelt Station Parkway
18
Greenbelt Station Parkway
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
Kiss and Ride
0 (0)
0 (0)
14 (41)
I-95 Off-ramps
Greenbelt Station Parkway
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29 (115)
0 (0)
WMATA Garage Exit
19
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14 (41)
0 (0)
0 (0)
WMATA Garage
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29 (115)
0 (0)
Greenbelt Station Parkway
20
0 (0)
14 (41)
0 (0)
0 (0)
Residential Access to 300 Units
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29 (115)
Greenbelt Station Parkway
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9 (25)
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49 (139)
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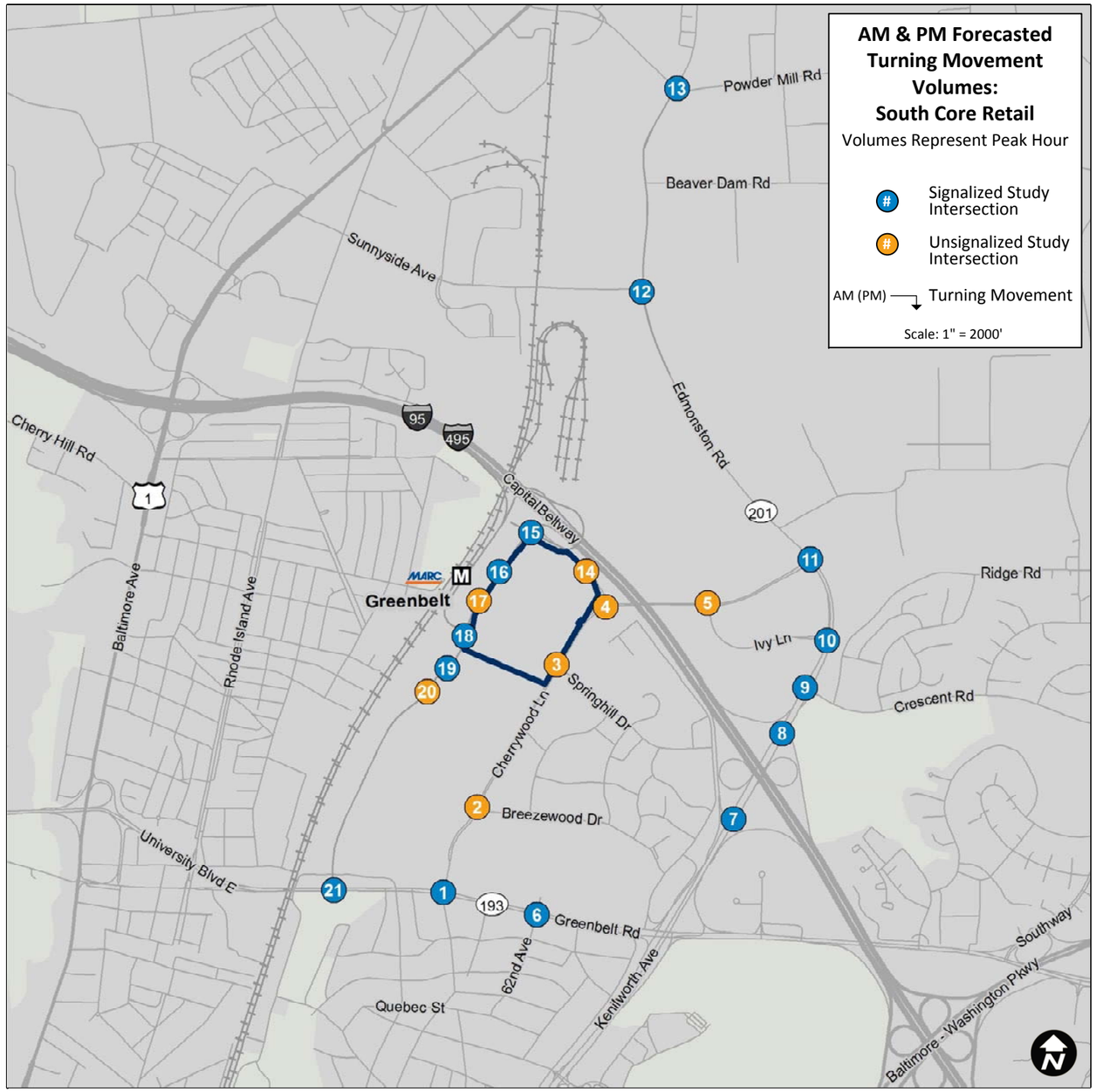
Greenbelt Road (MD 193)


AM & PM Forecasted Turning Movement Volumes:
South Core Retail
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Cherry Hill Rd
Edmonston Rd
Capital Beltway
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
Greenbelt
MARC
Baltimore Ave
Rhode Island Ave
University Blvd E
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy
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495
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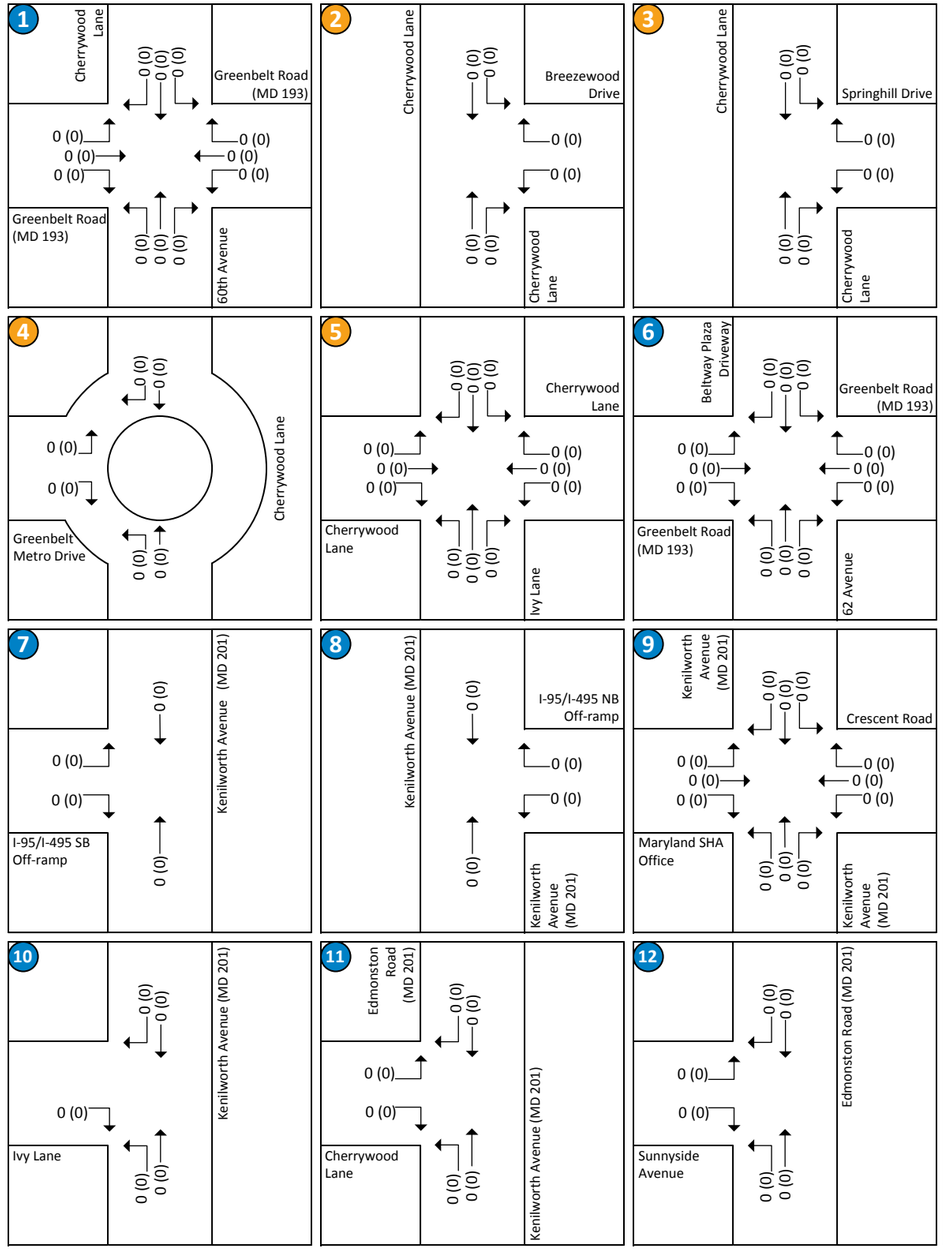
201
193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Cherrywood Lane
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)
60th Avenue
2
Cherrywood Lane
Breezewood Drive
Cherrywood Lane
3
Cherrywood Lane
Springhill Drive
Cherrywood Lane
4
Cherrywood Lane
Greenbelt Metro Drive
5
Cherrywood Lane
Cherrywood Lane
Ivy Lane
6
Beltway Plaza Driveway
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)
62 Avenue
7
Kenilworth Avenue (MD 201)
I-95/I-495 SB Off-ramp
Kenilworth Avenue (MD 201)
8
Kenilworth Avenue (MD 201)
I-95/I-495 NB Off-ramp
Kenilworth Avenue (MD 201)
9
Kenilworth Avenue (MD 201)
Crescent Road
Maryland SHA Office
Kenilworth Avenue (MD 201)
10
Kenilworth Avenue (MD 201)
Ivy Lane
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Cherrywood Lane
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Sunnyside Avenue
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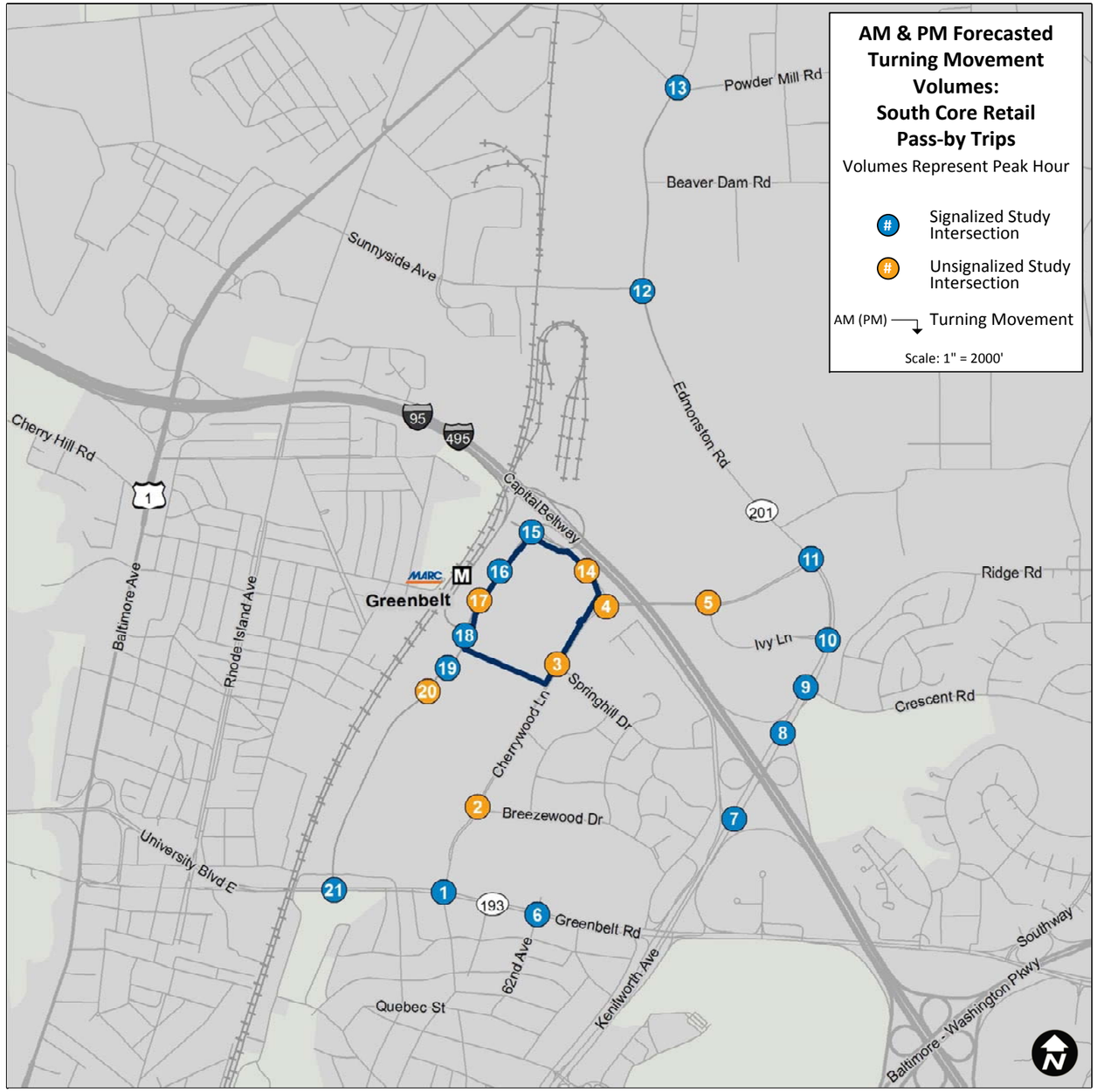
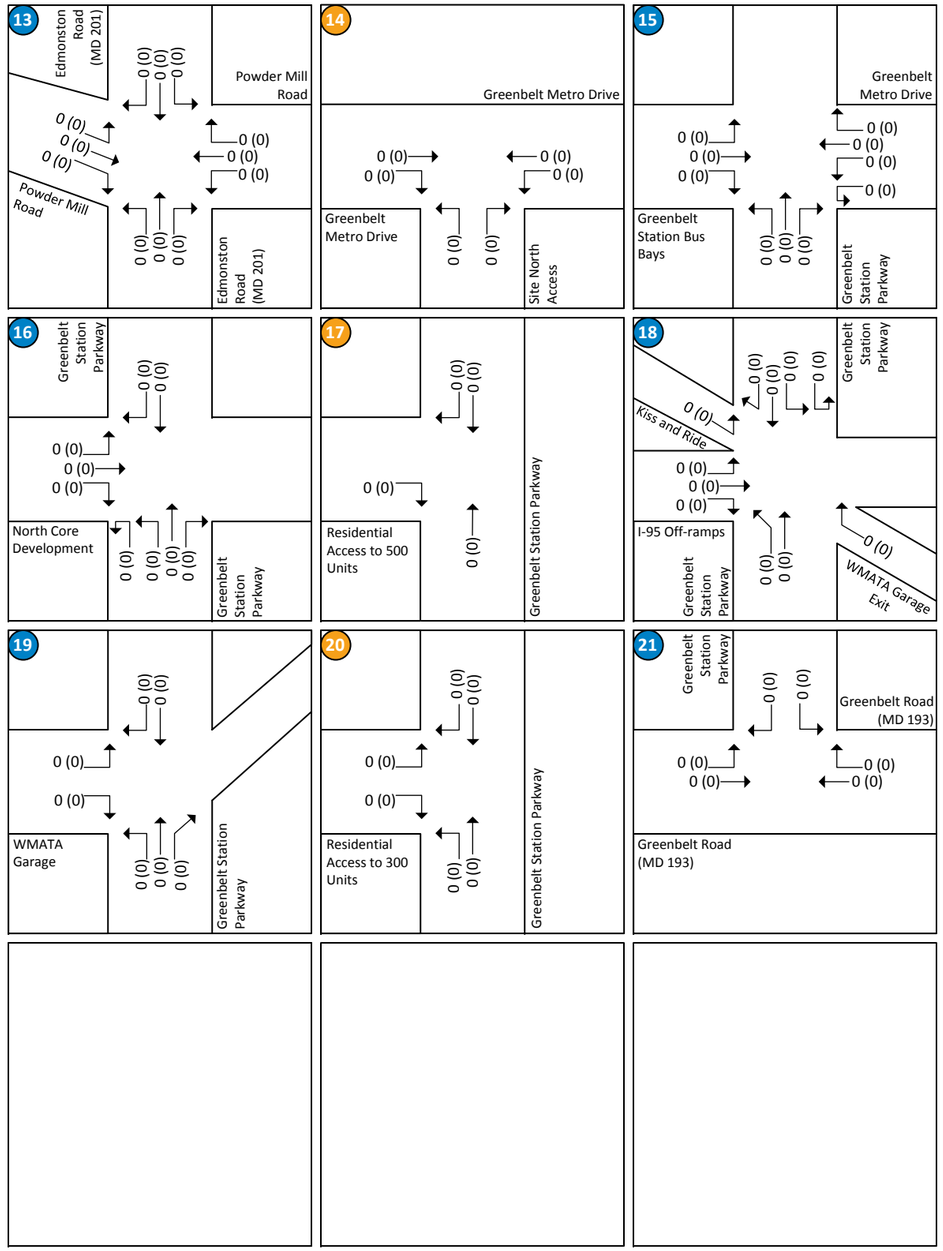

AM & PM Forecasted Turning Movement Volumes: South Core Retail Pass-by Trips
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
95
495
Capital Beltway
201
Ridge Rd
Baltimore Ave
Rhode Island Ave
MARC
Greenbelt
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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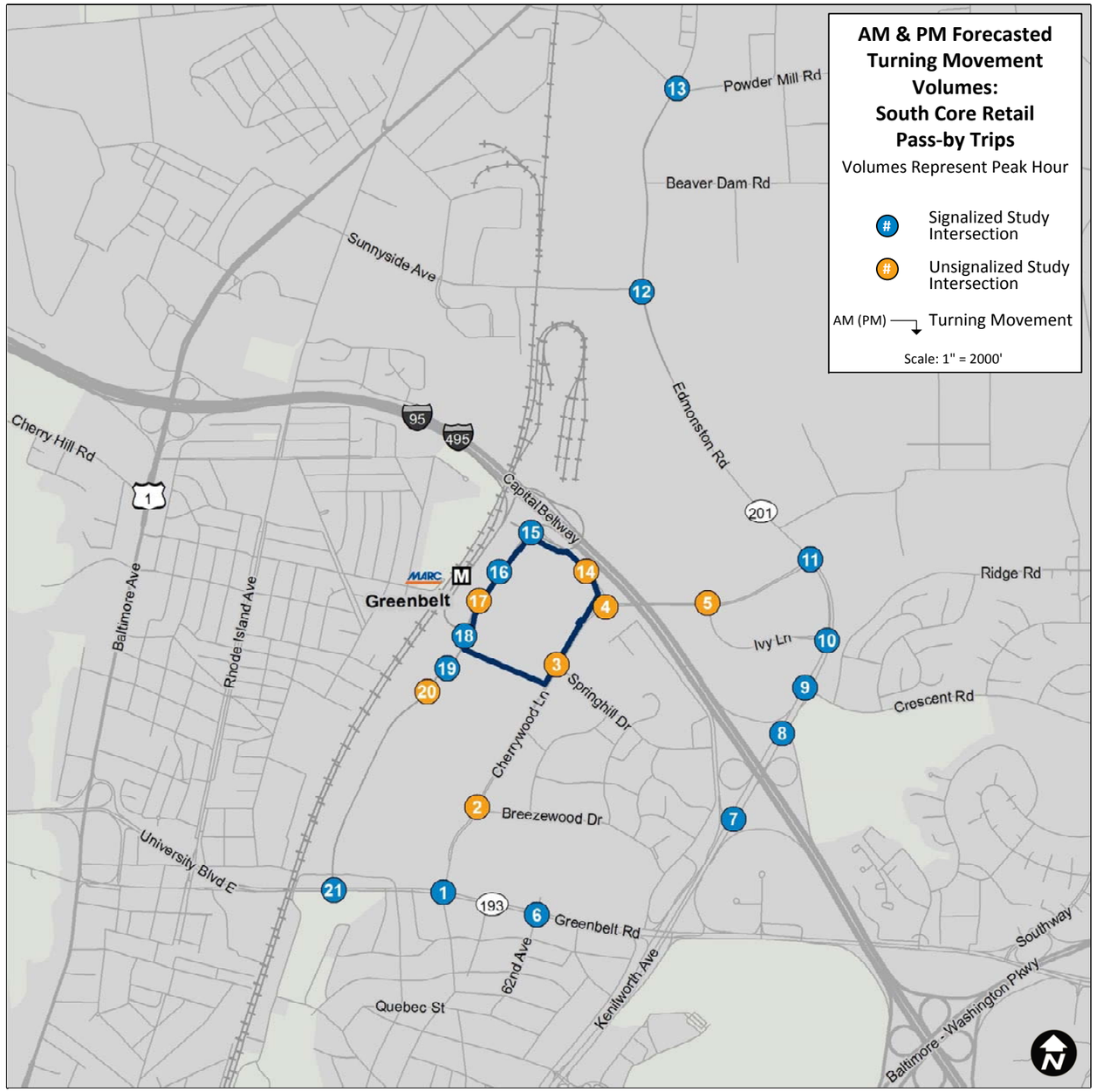
Edmonston Road (MD 201)
Powder Mill Road
Powder Mill Road
Edmonston Road (MD 201)
14
Greenbelt Metro Drive
Greenbelt Metro Drive
Site North Access
15
Greenbelt Metro Drive
Greenbelt Station Bus Bays
Greenbelt Station Parkway
16
Greenbelt Station Parkway
North Core Development
Greenbelt Station Parkway
17
Residential Access to 500 Units
Greenbelt Station Parkway
18
Greenbelt Station Parkway
Kiss and Ride
I-95 Off-ramps
Greenbelt Station Parkway
WMATA Garage Exit
19
WMATA Garage
Greenbelt Station Parkway
20
Residential Access to 300 Units
Greenbelt Station Parkway
21
Greenbelt Station Parkway
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)


AM & PM Forecasted Turning Movement Volumes:
South Core Retail Pass-by Trips
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Cherry Hill Rd
Edmonston Rd
Capital Beltway
Greenbelt
Baltimore Ave
Rhode Island Ave
Ridge Rd
Ivy Ln
Crescent Rd
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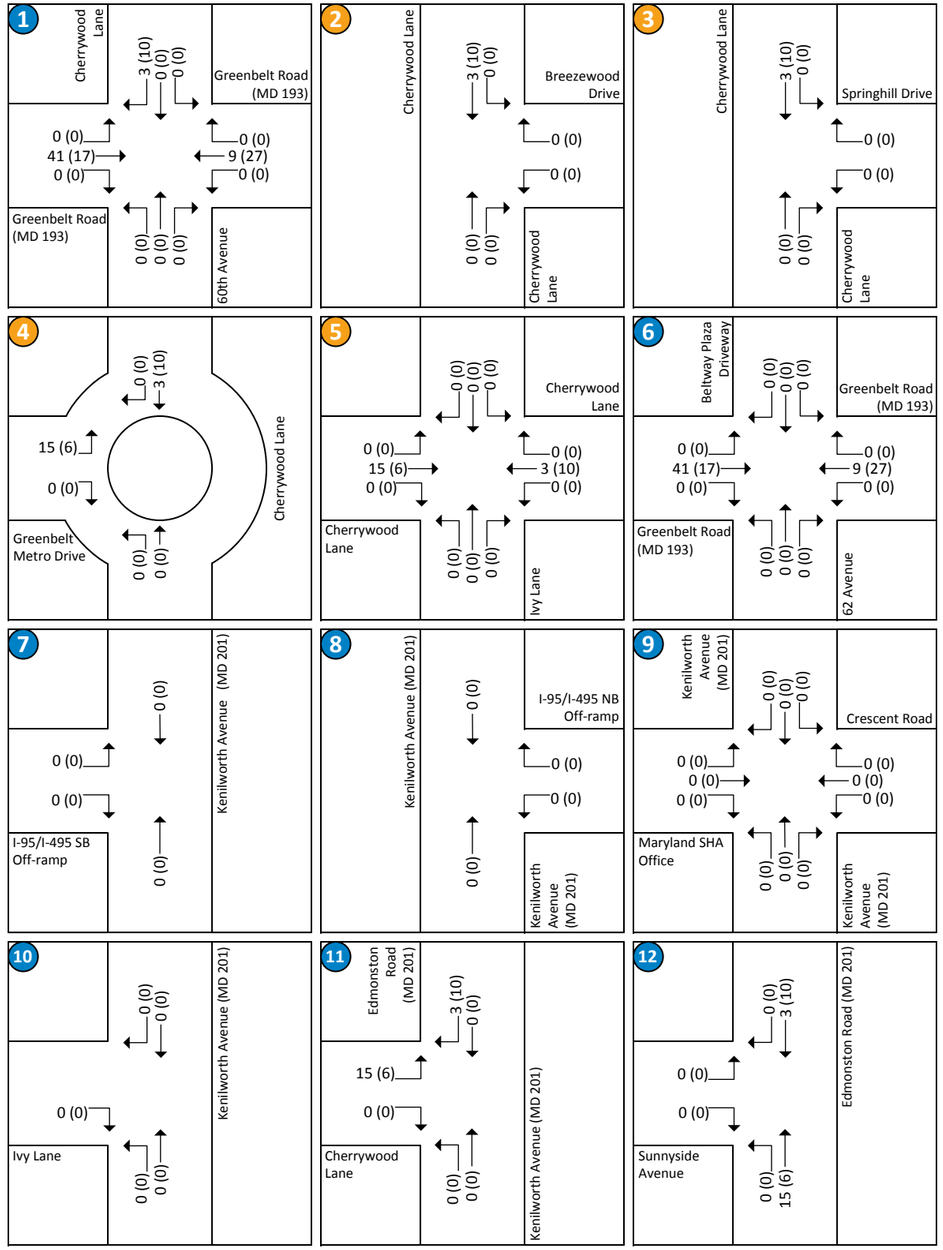
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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Greenbelt Road (MD 193)
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9 (27)
2
Cherrywood Lane
Breezewood Drive
Cherrywood Lane
3
Cherrywood Lane
Springhill Drive
Cherrywood Lane
4
Cherrywood Lane
Greenbelt Metro Drive
15 (6)
5
Cherrywood Lane
Cherrywood Lane
Ivy Lane
6
Beltway Plaza Driveway
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)
62 Avenue
7
Kenilworth Avenue (MD 201)
I-95/I-495 SB Off-ramp
8
Kenilworth Avenue (MD 201)
I-95/I-495 NB Off-ramp
9
Kenilworth Avenue (MD 201)
Crescent Road
Maryland SHA Office
10
Kenilworth Avenue (MD 201)
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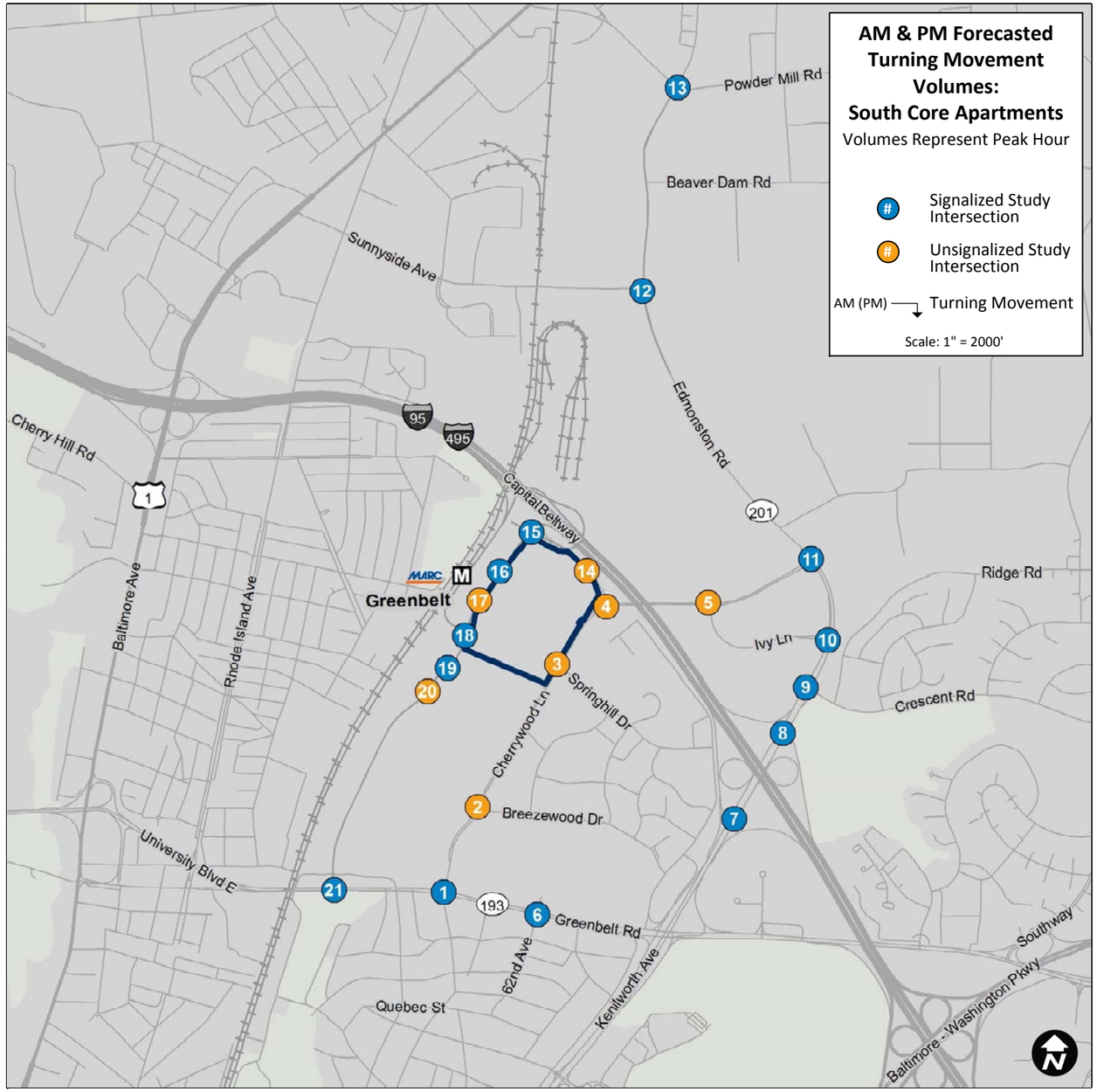
Edmonston Road (MD 201)
Kenilworth Avenue (MD 201)
Cherrywood Lane
12
Edmonston Road (MD 201)
Sunnyside Avenue


AM & PM Forecasted Turning Movement Volumes:
South Core Apartments
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
Capital Beltway
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
University Blvd E
Greenbelt Rd
Quebec St
62nd Ave
Kenilworth Ave
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Rhode Island Ave
Southway
Baltimore - Washington Pkwy
Greenbelt
MARC
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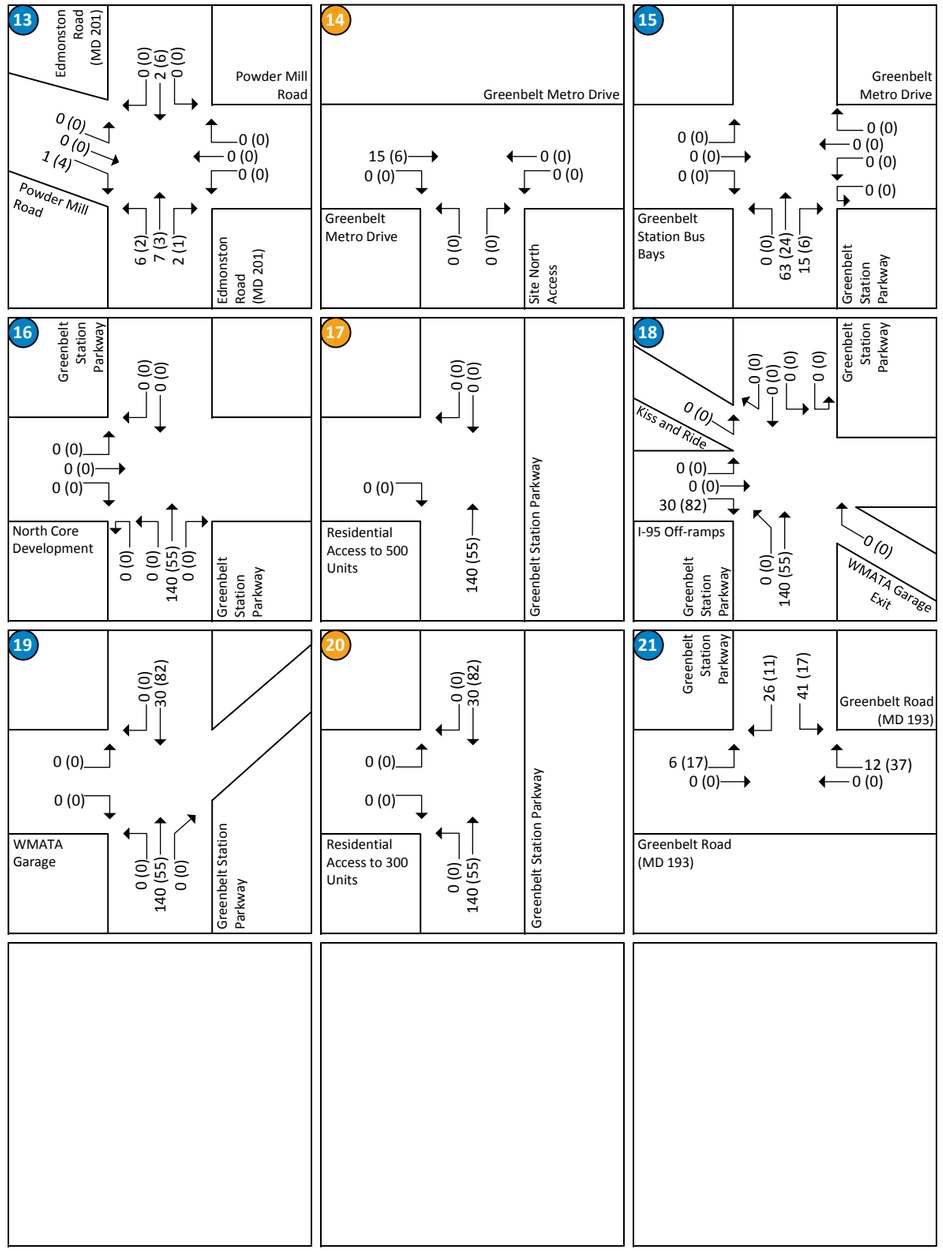
193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Powder Mill Road
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Edmonston Road (MD 201)
14
Greenbelt Metro Drive
15 (6)
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0 (0)
Greenbelt Metro Drive
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0 (0)
Site North Access
15
Greenbelt Metro Drive
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0 (0)
0 (0)
0 (0)
Greenbelt Station Bus Bays
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63 (24)
15 (6)
Greenbelt Station Parkway
16
Greenbelt Station Parkway
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North Core Development
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140 (55)
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Greenbelt Station Parkway
17
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Residential Access to 500 Units
140 (55)
Greenbelt Station Parkway
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Greenbelt Station Parkway
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0 (0)
Kiss and Ride
0 (0)
0 (0)
30 (82)
I-95 Off-ramps
Greenbelt Station Parkway
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140 (55)
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WMATA Garage Exit
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30 (82)
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WMATA Garage
0 (0)
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Greenbelt Station Parkway
20
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Residential Access to 300 Units
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140 (55)
Greenbelt Station Parkway
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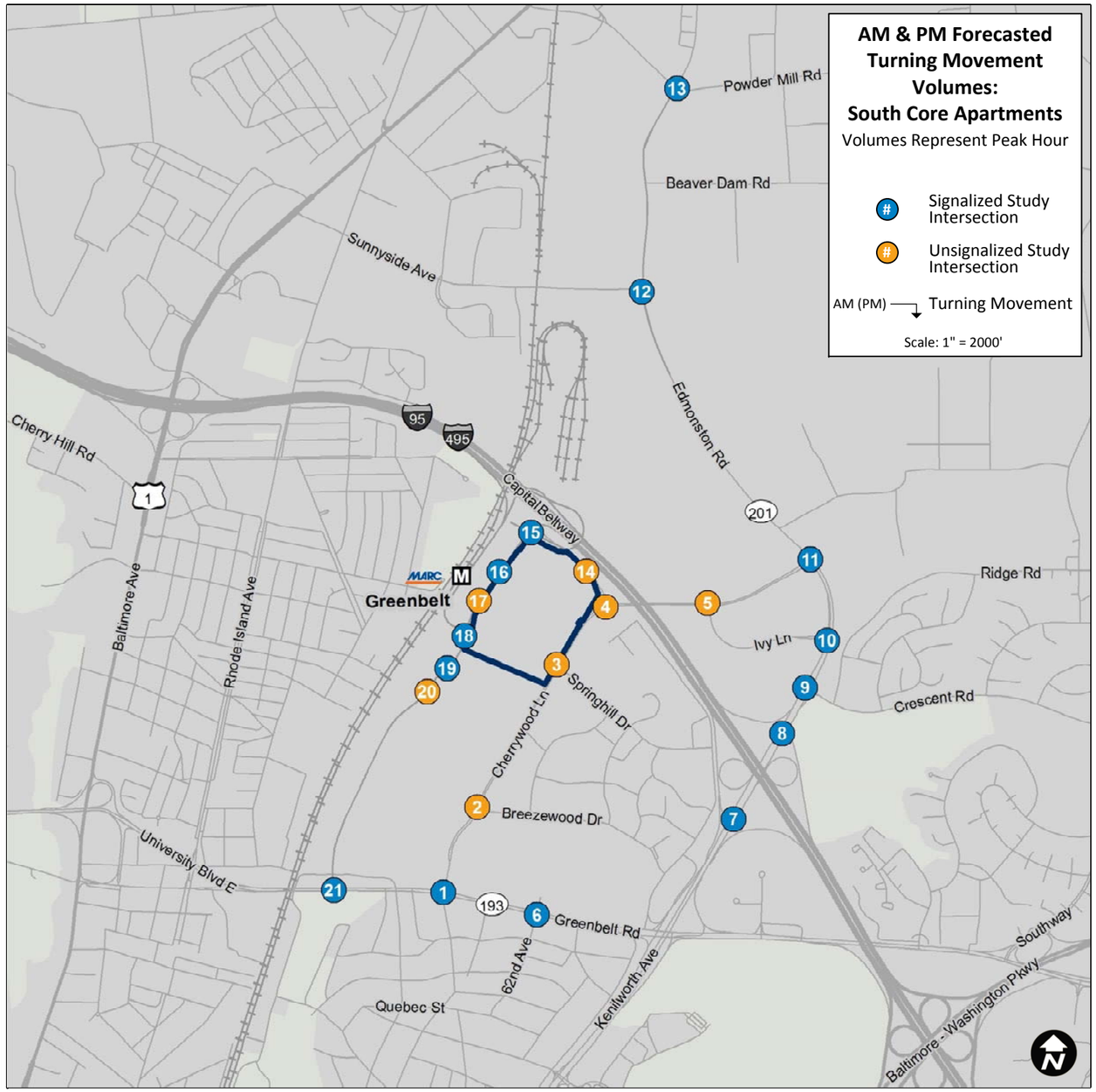
AM & PM Forecasted Turning Movement Volumes:
South Core Apartments
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Cherry Hill Rd
Edmonston Rd
Capital Beltway
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
Greenbelt
MARC
Baltimore Ave
Rhode Island Ave
University Blvd E
Greenbelt Rd
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Kenilworth Ave
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Southway
Baltimore - Washington Pkwy
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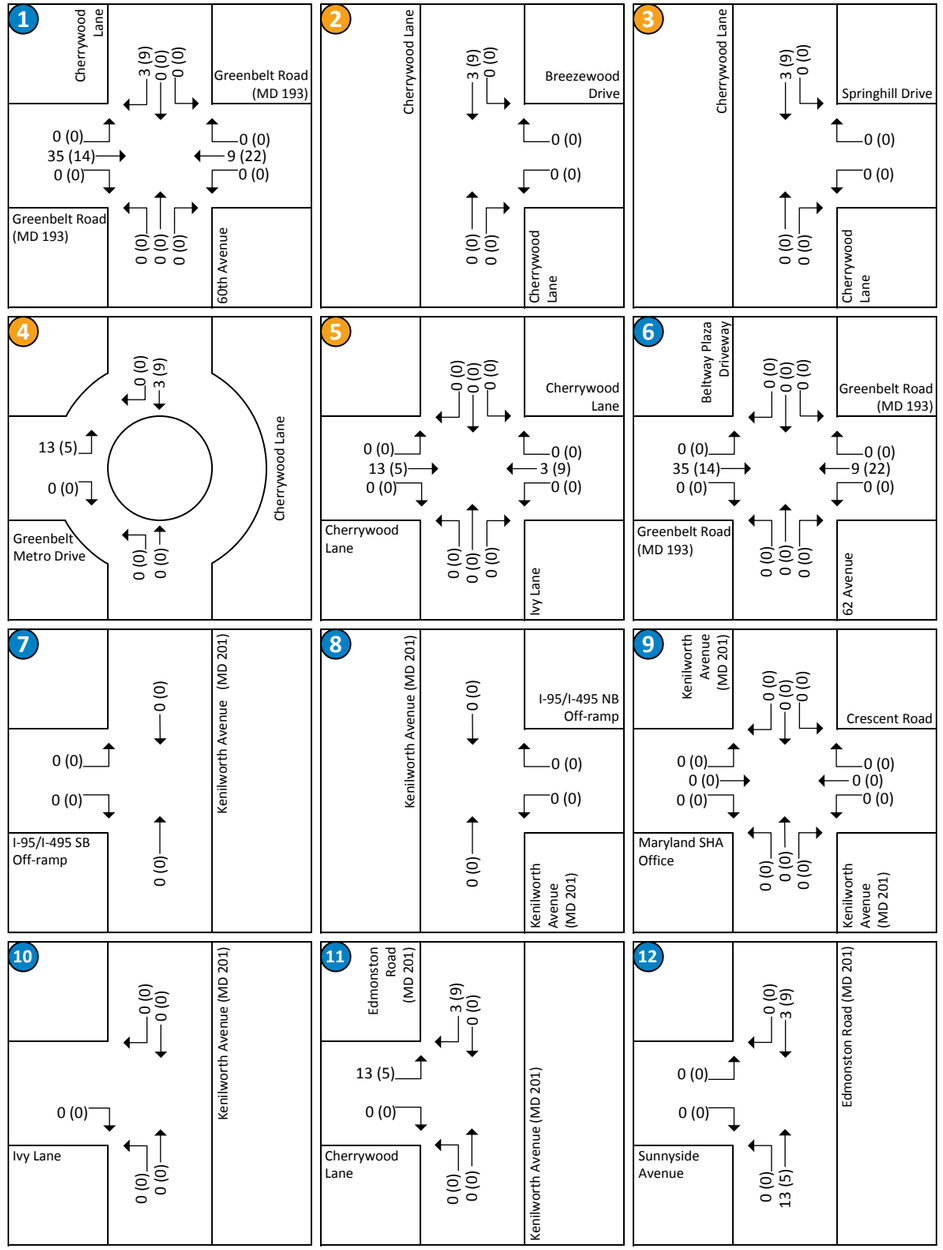
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9 (22)
Greenbelt Road (MD 193)
60th Avenue
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Cherrywood Lane
Breezewood Drive
Cherrywood Lane
3
Cherrywood Lane
Springhill Drive
Cherrywood Lane
4
Cherrywood Lane
13 (5)
Greenbelt Metro Drive
5
Cherrywood Lane
13 (5)
3 (9)
Cherrywood Lane
Ivy Lane
6
Beltway Plaza Driveway
Greenbelt Road (MD 193)
35 (14)
9 (22)
Greenbelt Road (MD 193)
62 Avenue
7
Kenilworth Avenue (MD 201)
I-95/I-495 SB Off-ramp
Kenilworth Avenue (MD 201)
8
Kenilworth Avenue (MD 201)
I-95/I-495 NB Off-ramp
Kenilworth Avenue (MD 201)
9
Kenilworth Avenue (MD 201)
Crescent Road
Maryland SHA Office
Kenilworth Avenue (MD 201)
10
Kenilworth Avenue (MD 201)
Ivy Lane
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Kenilworth Avenue (MD 201)
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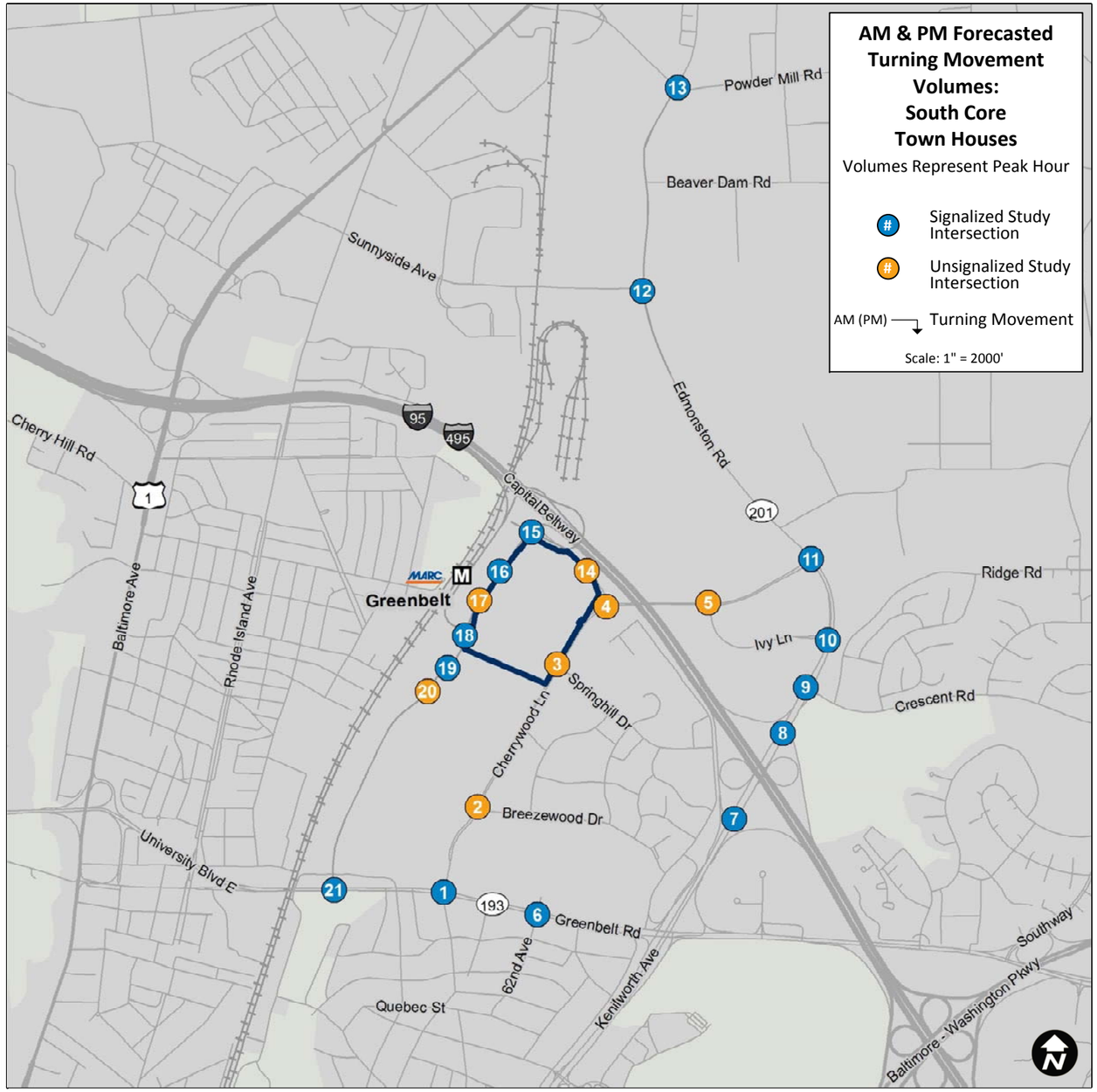
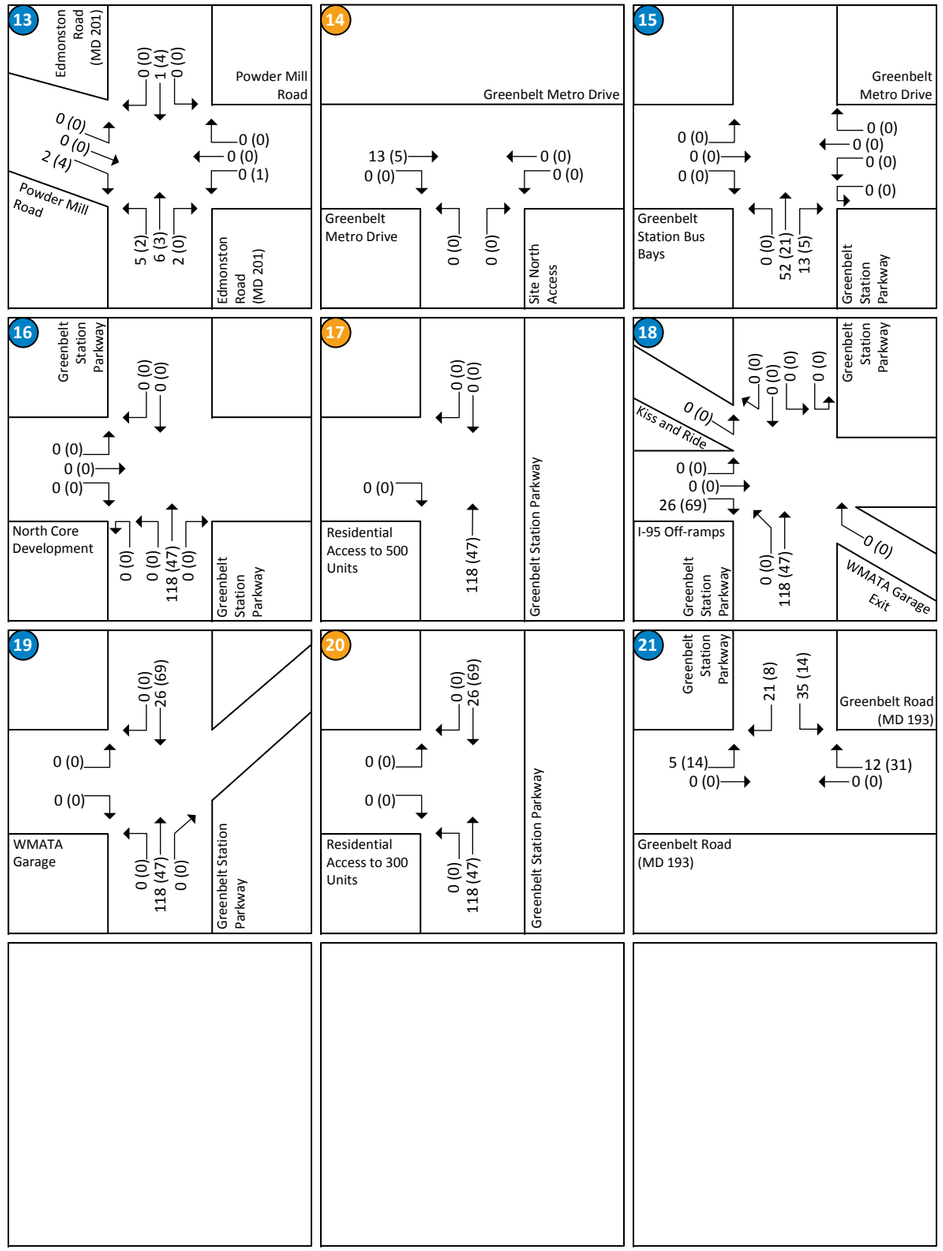
Edmonston Road (MD 201)
Sunnyside Avenue


AM & PM Forecasted Turning Movement Volumes: South Core Town Houses
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
Capital Beltway
Ridge Rd
Greenbelt
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
University Blvd E
Greenbelt Rd
Quebec St
62nd Ave
Kenilworth Ave
Southway
Baltimore - Washington Pkwy
Baltimore Ave
Rhode Island Ave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Edmonston Road (MD 201)
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Site North Access
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118 (47)
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Greenbelt Station Parkway
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Residential Access to 500 Units
118 (47)
Greenbelt Station Parkway
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Greenbelt Station Parkway
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I-95 Off-ramps
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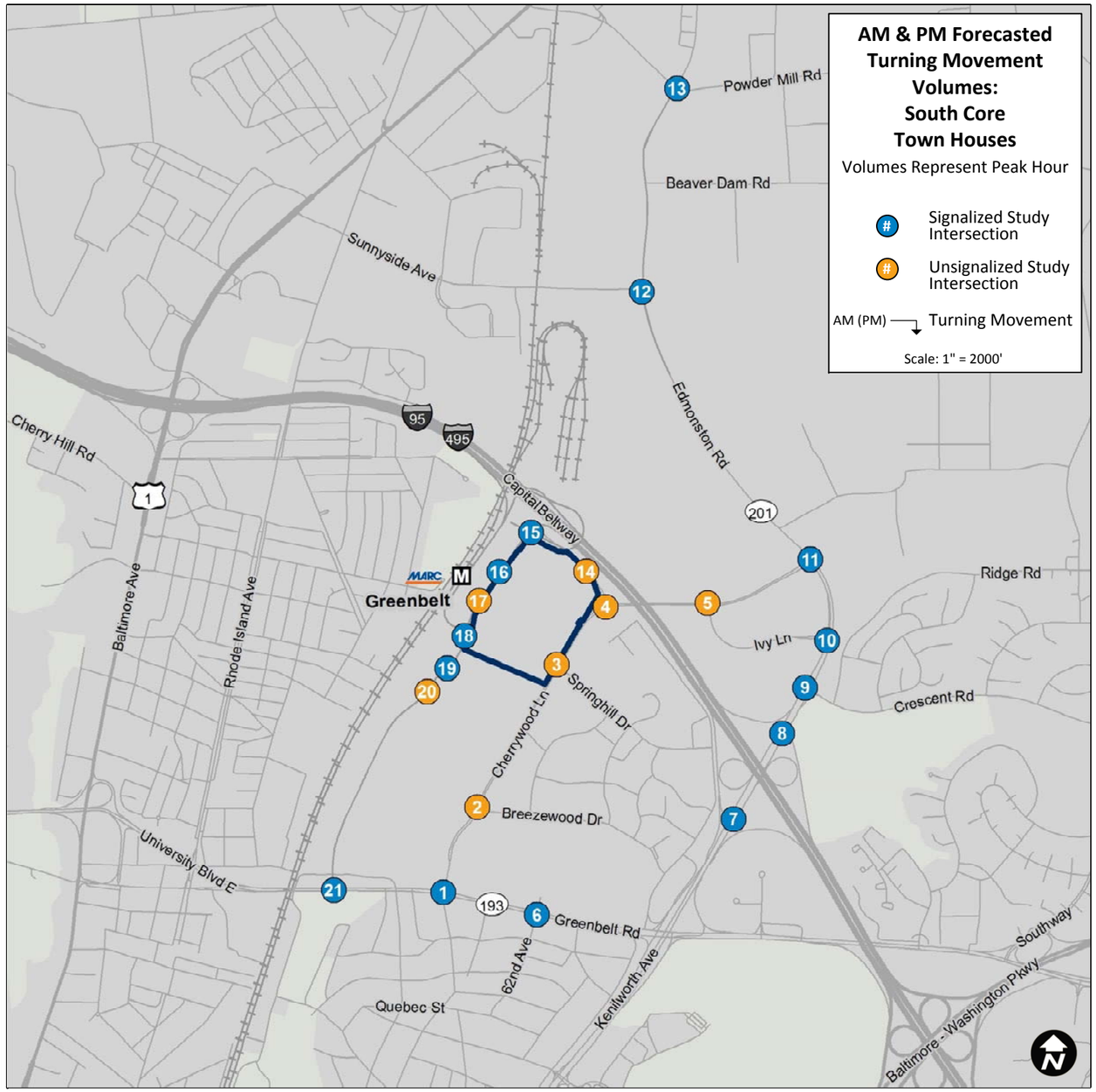
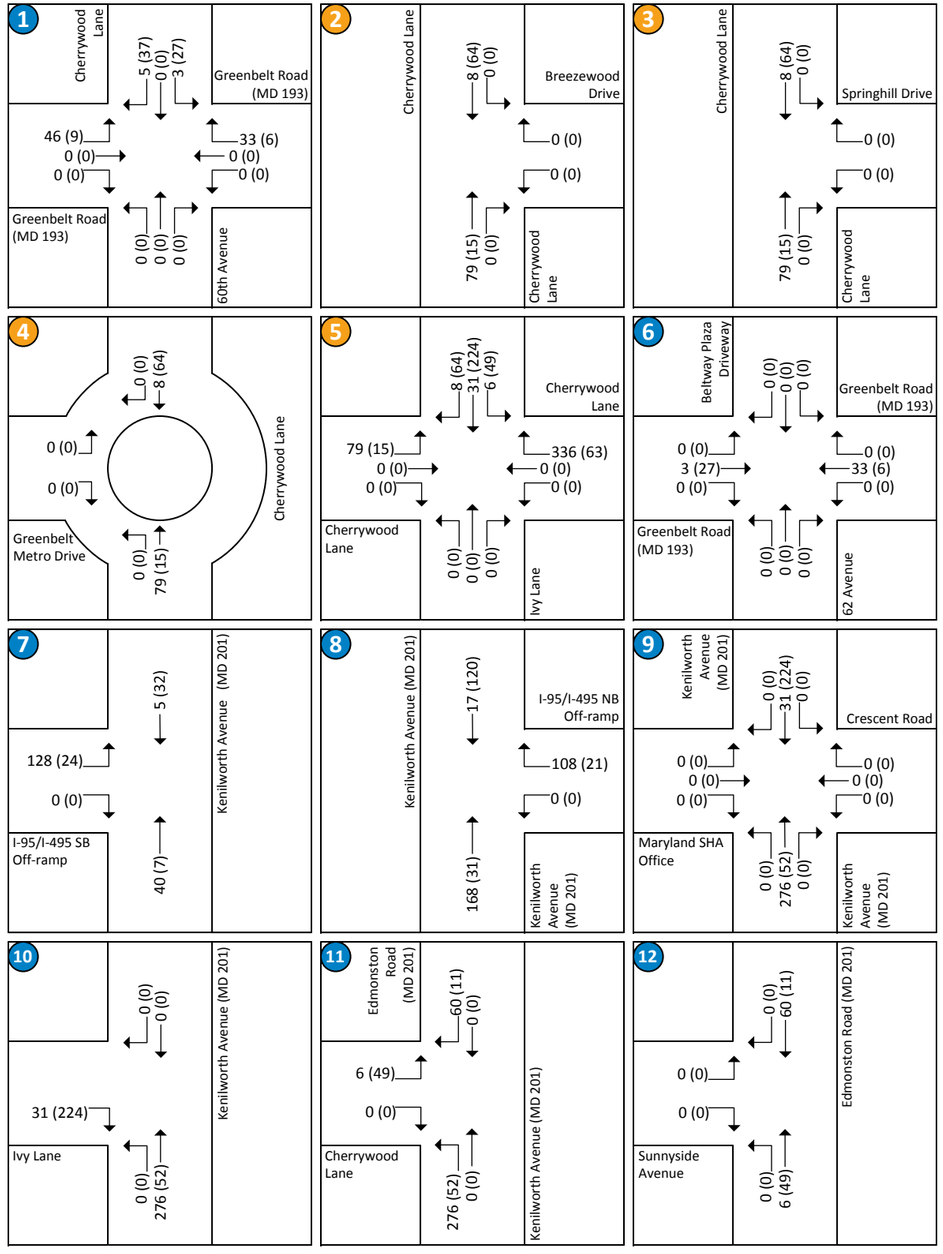
26 (69)
0 (0)
0 (0)
WMATA Garage
0 (0)
118 (47)
0 (0)
Greenbelt Station Parkway
20
0 (0)
26 (69)
0 (0)
0 (0)
Residential Access to 300 Units
0 (0)
118 (47)
Greenbelt Station Parkway
21
Greenbelt Station Parkway
21 (8)
35 (14)
5 (14)
0 (0)
12 (31)
0 (0)
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)


AM & PM Forecasted Turning Movement Volumes: South Core Town Houses
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
95
495
Capital Beltway
201
1
Baltimore Ave
Rhode Island Ave
MARC
M
Greenbelt
Ridge Rd
Ivy Ln
Springhill Dr
Cherrywood Ln
Crescent Rd
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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Cherrywood Lane
5 (37)
0 (0)
3 (27)
Greenbelt Road (MD 193)
46 (9)
0 (0)
0 (0)
33 (6)
0 (0)
0 (0)
Greenbelt Road (MD 193)
0 (0)
0 (0)
0 (0)
60th Avenue
2
Cherrywood Lane
8 (64)
0 (0)
Breezewood Drive
0 (0)
0 (0)
79 (15)
0 (0)
Cherrywood Lane
3
Cherrywood Lane
8 (64)
0 (0)
Springhill Drive
0 (0)
0 (0)
79 (15)
0 (0)
Cherrywood Lane
4
0 (0)
8 (64)
0 (0)
0 (0)
Cherrywood Lane
Greenbelt Metro Drive
0 (0)
79 (15)
5
8 (64)
31 (224)
6 (49)
Cherrywood Lane
79 (15)
0 (0)
0 (0)
336 (63)
0 (0)
0 (0)
Cherrywood Lane
0 (0)
0 (0)
0 (0)
Ivy Lane
6
Beltway Plaza Driveway
0 (0)
0 (0)
0 (0)
Greenbelt Road (MD 193)
0 (0)
3 (27)
0 (0)
0 (0)
33 (6)
0 (0)
Greenbelt Road (MD 193)
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0 (0)
0 (0)
62 Avenue
7
5 (32)
128 (24)
0 (0)
Kenilworth Avenue (MD 201)
I-95/I-495 SB Off-ramp
40 (7)
8
Kenilworth Avenue (MD 201)
17 (120)
I-95/I-495 NB Off-ramp
108 (21)
0 (0)
168 (31)
Kenilworth Avenue (MD 201)
9
Kenilworth Avenue (MD 201)
0 (0)
31 (224)
0 (0)
Crescent Road
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
Maryland SHA Office
0 (0)
276 (52)
0 (0)
Kenilworth Avenue (MD 201)
10
0 (0)
0 (0)
31 (224)
Kenilworth Avenue (MD 201)
Ivy Lane
0 (0)
276 (52)
11
Edmonston Road (MD 201)
60 (11)
0 (0)
6 (49)
0 (0)
Kenilworth Avenue (MD 201)
Cherrywood Lane
276 (52)
0 (0)
12
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60 (11)
Edmonston Road (MD 201)
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Sunnyside Avenue
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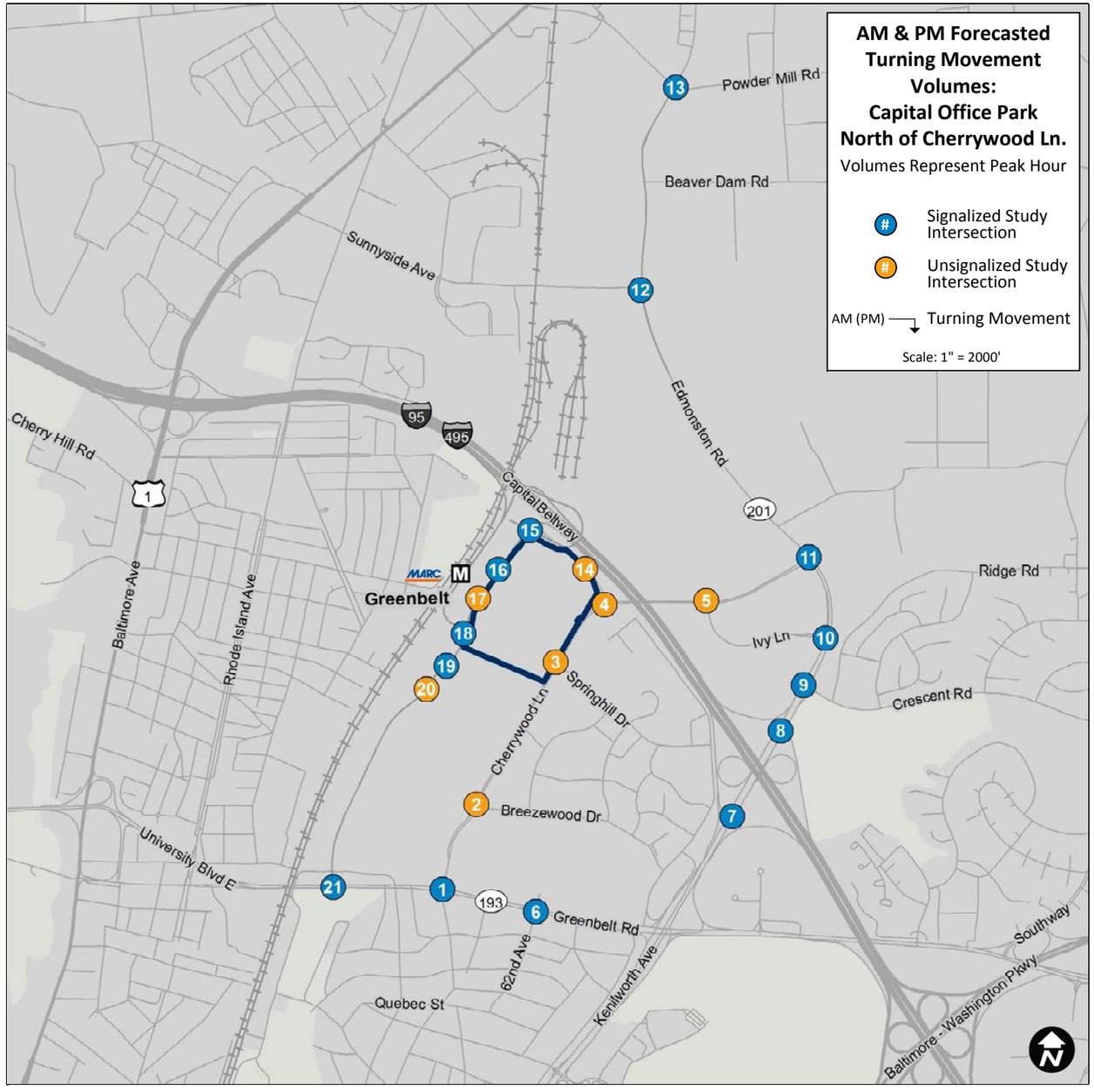
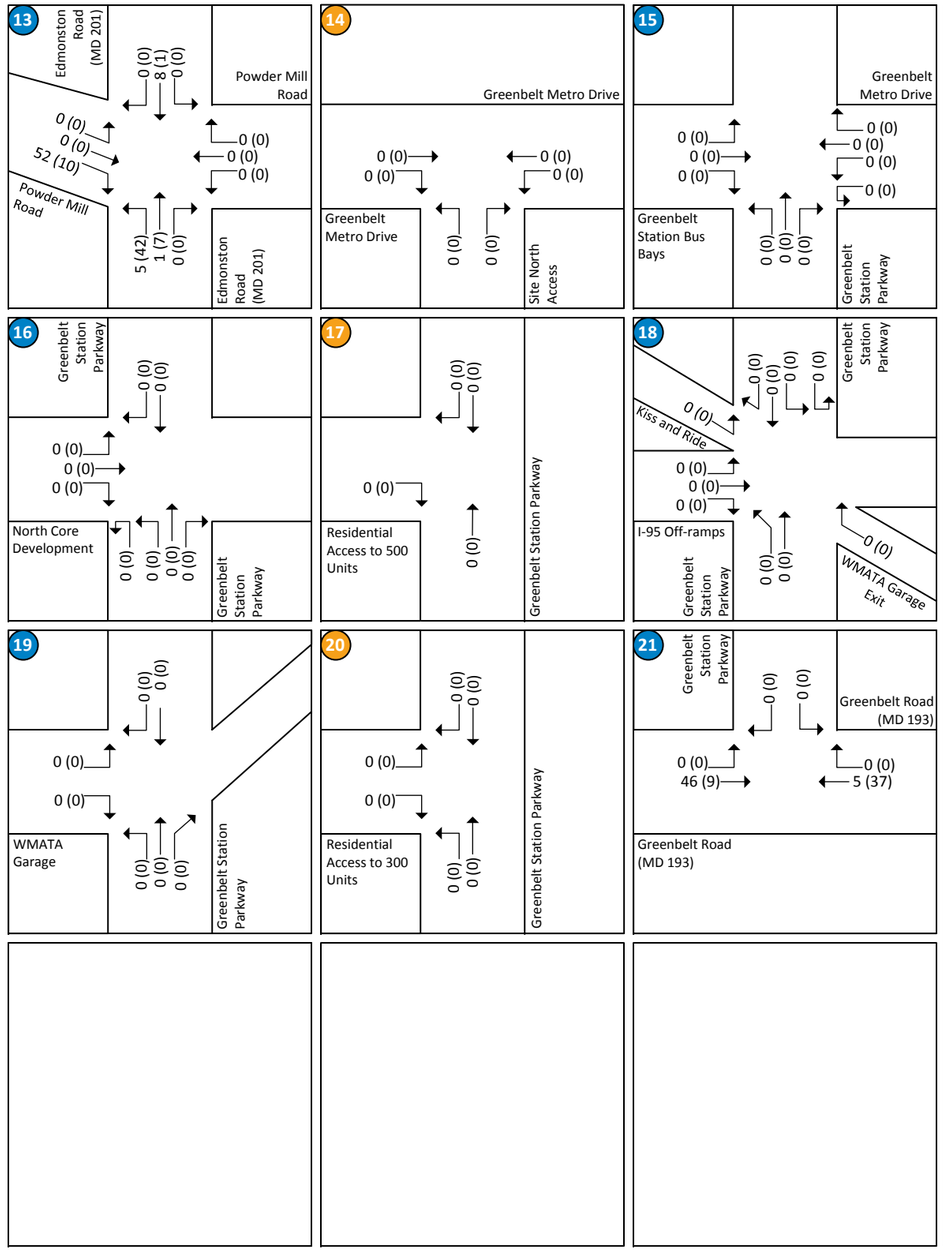
6 (49)


AM & PM Forecasted Turning Movement Volumes:
Capital Office Park
North of Cherrywood Ln.
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
Capital Beltway
Baltimore Ave
Rhode Island Ave
Greenbelt
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
University Blvd E
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy
95
495
1
201
193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Edmonston Road (MD 201)
Powder Mill Road
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8 (1)
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0 (0)
0 (0)
52 (10)
Powder Mill Road
0 (0)
0 (0)
0 (0)
5 (42)
1 (7)
0 (0)
Edmonston Road (MD 201)
14
Greenbelt Metro Drive
0 (0)
0 (0)
0 (0)
0 (0)
Greenbelt Metro Drive
0 (0)
0 (0)
Site North Access
15
Greenbelt Metro Drive
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
Greenbelt Station Bus Bays
0 (0)
0 (0)
0 (0)
Greenbelt Station Parkway
16
Greenbelt Station Parkway
0 (0)
0 (0)
0 (0)
0 (0)
North Core Development
0 (0)
0 (0)
0 (0)
0 (0)
Greenbelt Station Parkway
17
0 (0)
0 (0)
0 (0)
Residential Access to 500 Units
0 (0)
Greenbelt Station Parkway
18
Greenbelt Station Parkway
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
Kiss and Ride
0 (0)
0 (0)
0 (0)
I-95 Off-ramps
0 (0)
0 (0)
Greenbelt Station Parkway
0 (0)
WMATA Garage Exit
19
0 (0)
0 (0)
0 (0)
0 (0)
WMATA Garage
0 (0)
0 (0)
0 (0)
Greenbelt Station Parkway
20
0 (0)
0 (0)
0 (0)
0 (0)
Residential Access to 300 Units
0 (0)
0 (0)
Greenbelt Station Parkway
21
Greenbelt Station Parkway
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0 (0)
Greenbelt Road (MD 193)
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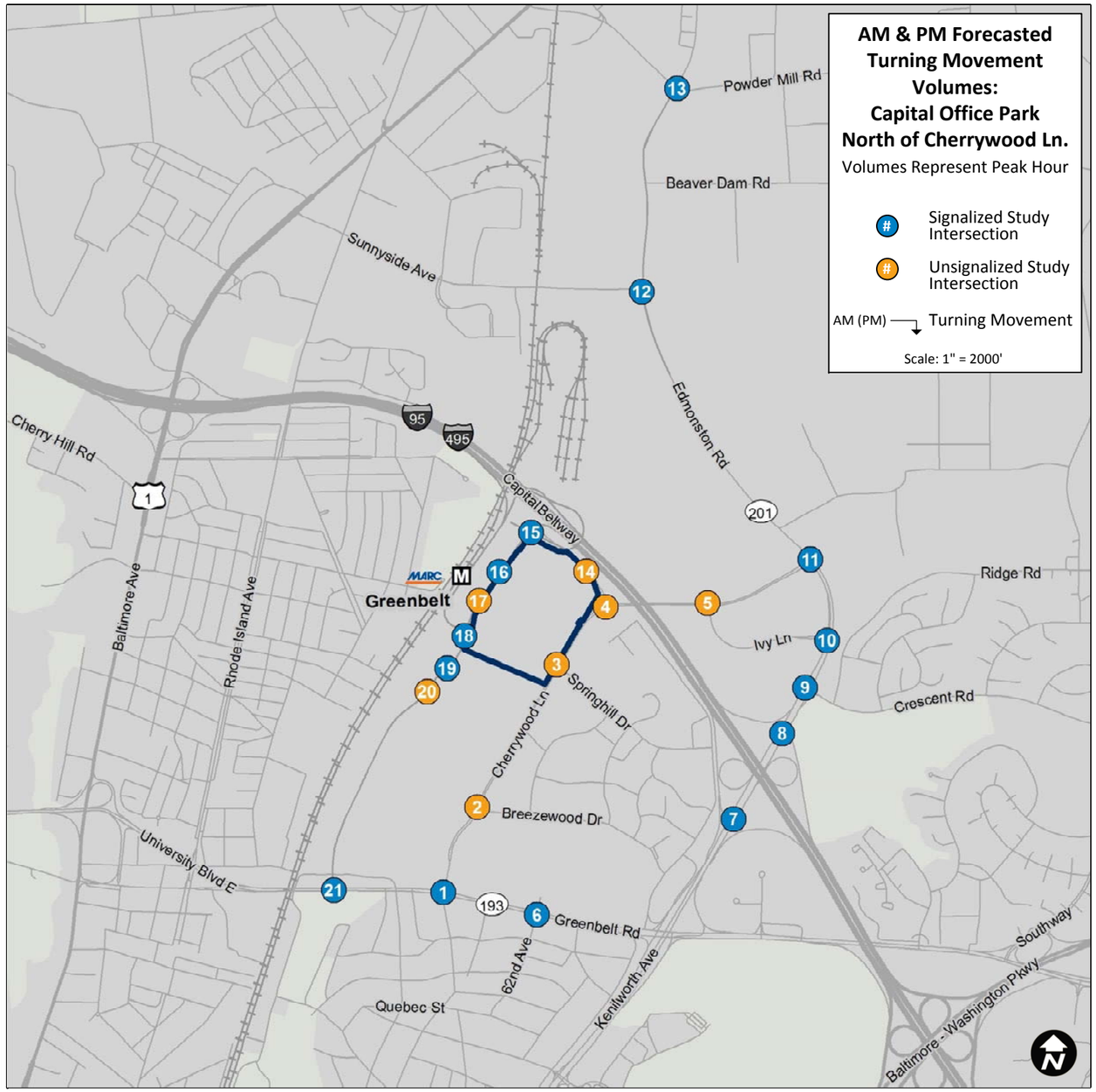
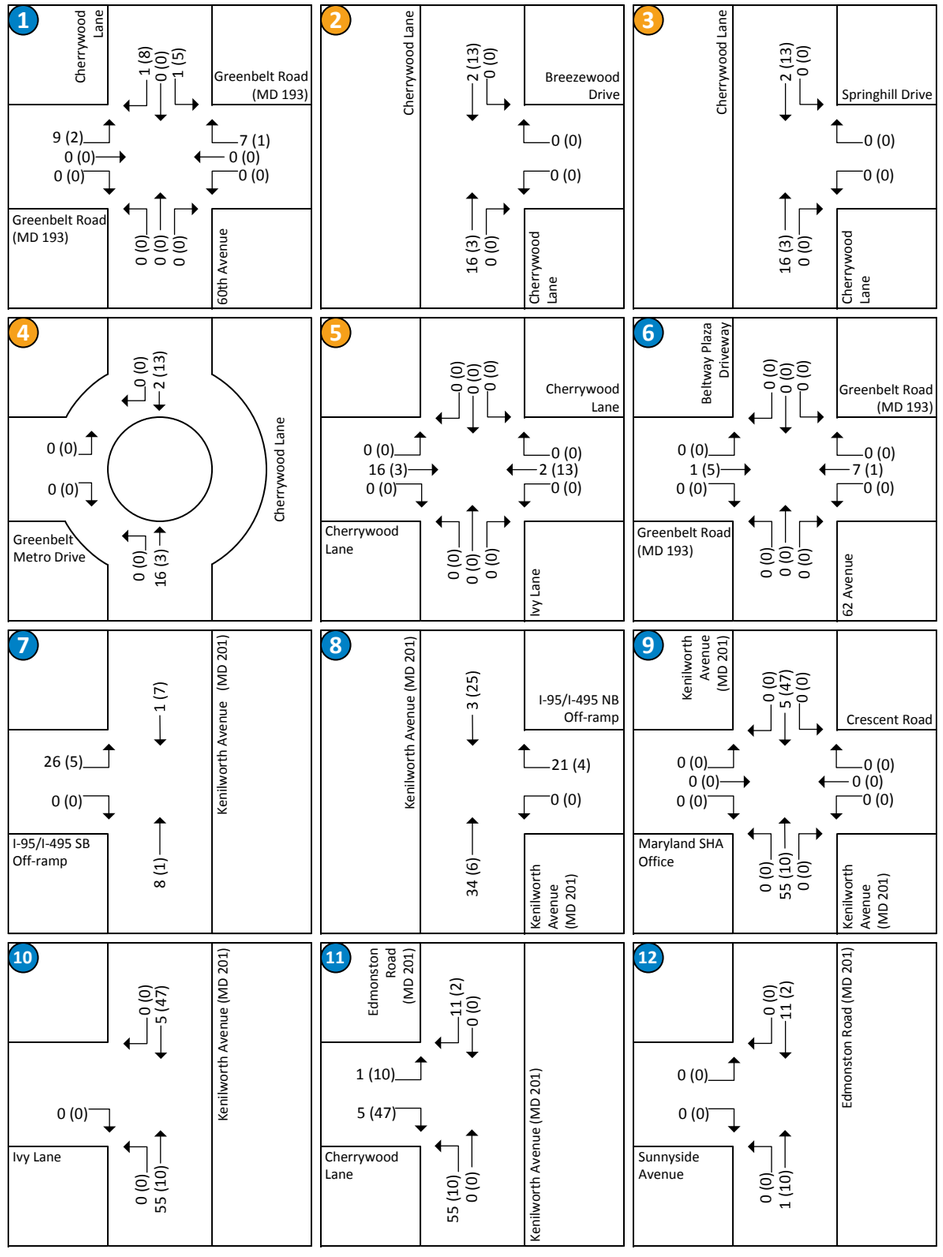
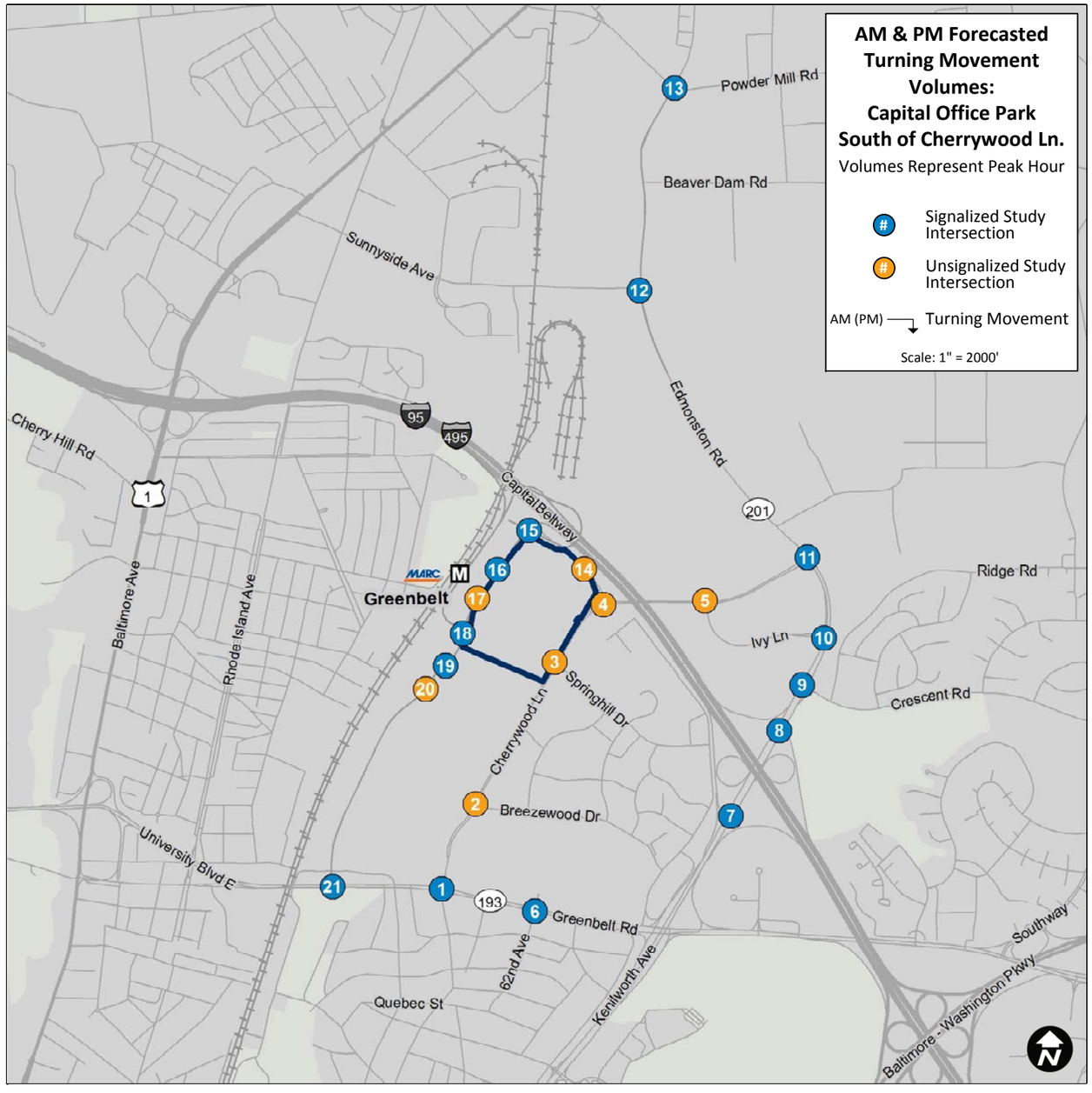
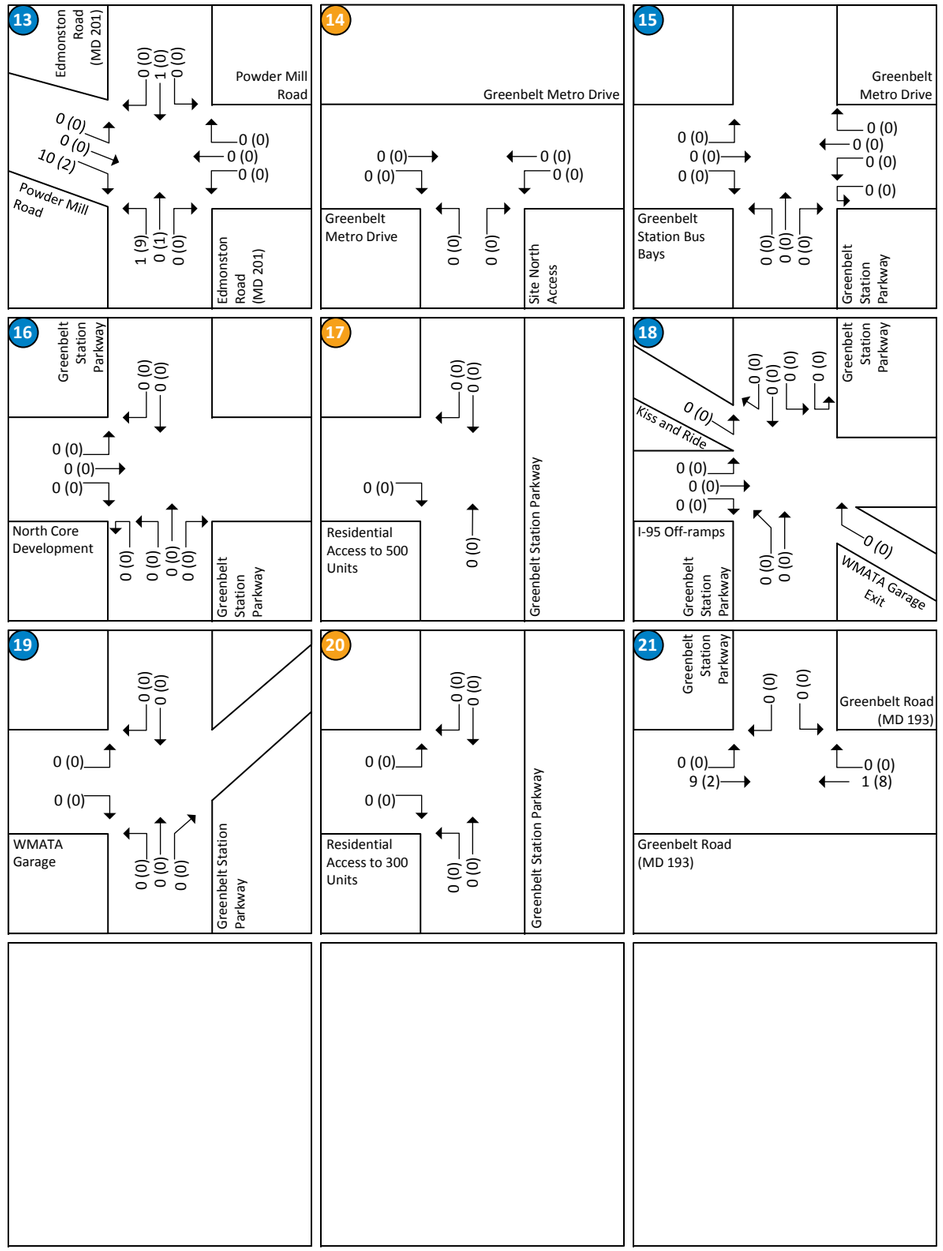
46 (9)
0 (0)
5 (37)
Greenbelt Road (MD 193)


AM & PM Forecasted Turning Movement Volumes:
Capital Office Park
North of Cherrywood Ln.
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Cherry Hill Rd
Edmonston Rd
Capital Beltway
95
495
1
201
Baltimore Ave
Rhode Island Ave
MARC
M
Greenbelt
Ridge Rd
Ivy Ln
Springhill Dr
Cherrywood Ln
Crescent Rd
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy


1
Cherrywood Lane
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)
60th Avenue
1 (8)
0 (0)
1 (5)
9 (2)
0 (0)
0 (0)
7 (1)
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
2
Cherrywood Lane
Breezewood Drive
Cherrywood Lane
2 (13)
0 (0)
0 (0)
0 (0)
16 (3)
0 (0)
3
Cherrywood Lane
Springhill Drive
Cherrywood Lane
2 (13)
0 (0)
0 (0)
16 (3)
0 (0)
4
Cherrywood Lane
Greenbelt Metro Drive
0 (0)
2 (13)
0 (0)
0 (0)
0 (0)
16 (3)
5
Cherrywood Lane
Cherrywood Lane
Ivy Lane
0 (0)
0 (0)
0 (0)
0 (0)
16 (3)
0 (0)
2 (13)
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
6
Beltway Plaza Driveway
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)
62 Avenue
0 (0)
0 (0)
0 (0)
0 (0)
1 (5)
0 (0)
0 (0)
7 (1)
0 (0)
0 (0)
0 (0)
0 (0)
7
Kenilworth Avenue (MD 201)
I-95/I-495 SB Off-ramp
Kenilworth Avenue (MD 201)
1 (7)
26 (5)
0 (0)
8 (1)
8
Kenilworth Avenue (MD 201)
I-95/I-495 NB Off-ramp
Kenilworth Avenue (MD 201)
3 (25)
21 (4)
0 (0)
34 (6)
9
Kenilworth Avenue (MD 201)
Crescent Road
Maryland SHA Office
Kenilworth Avenue (MD 201)
0 (0)
5 (47)
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
55 (10)
0 (0)
10
Kenilworth Avenue (MD 201)
Ivy Lane
Kenilworth Avenue (MD 201)
0 (0)
5 (47)
0 (0)
0 (0)
55 (10)
11
Edmonston Road (MD 201)
Cherrywood Lane
Kenilworth Avenue (MD 201)
11 (2)
0 (0)
1 (10)
5 (47)
55 (10)
0 (0)
12
Edmonston Road (MD 201)
Sunnyside Avenue
Edmonston Road (MD 201)
0 (0)
11 (2)
0 (0)
0 (0)
0 (0)
1 (10)


AM & PM Forecasted Turning Movement Volumes:
Capital Office Park
South of Cherrywood Ln.
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
Capital Beltway
Baltimore Ave
Rhode Island Ave
Greenbelt
Ridge Rd
Ivy Ln
Crescent Rd
Cherrywood Ln
Springhill Dr
Breezewood Dr
University Blvd E
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy
95
495
1
201
193
MARC
M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Edmonston Road (MD 201)
Powder Mill Road
0 (0)
1 (0)
0 (0)
0 (0)
0 (0)
10 (2)
0 (0)
0 (0)
0 (0)
Powder Mill Road
1 (9)
0 (1)
0 (0)
Edmonston Road (MD 201)
14
Greenbelt Metro Drive
0 (0)
0 (0)
0 (0)
0 (0)
Greenbelt Metro Drive
0 (0)
0 (0)
Site North Access
15
Greenbelt Metro Drive
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
Greenbelt Station Bus Bays
0 (0)
0 (0)
0 (0)
Greenbelt Station Parkway
16
Greenbelt Station Parkway
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
North Core Development
0 (0)
0 (0)
0 (0)
0 (0)
Greenbelt Station Parkway
17
0 (0)
0 (0)
0 (0)
Residential Access to 500 Units
0 (0)
Greenbelt Station Parkway
18
Greenbelt Station Parkway
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
Kiss and Ride
0 (0)
0 (0)
0 (0)
I-95 Off-ramps
Greenbelt Station Parkway
0 (0)
0 (0)
0 (0)
WMATA Garage Exit
19
0 (0)
0 (0)
0 (0)
0 (0)
WMATA Garage
0 (0)
0 (0)
0 (0)
Greenbelt Station Parkway
20
0 (0)
0 (0)
0 (0)
0 (0)
Residential Access to 300 Units
0 (0)
0 (0)
Greenbelt Station Parkway
21
Greenbelt Station Parkway
0 (0)
0 (0)
Greenbelt Road (MD 193)
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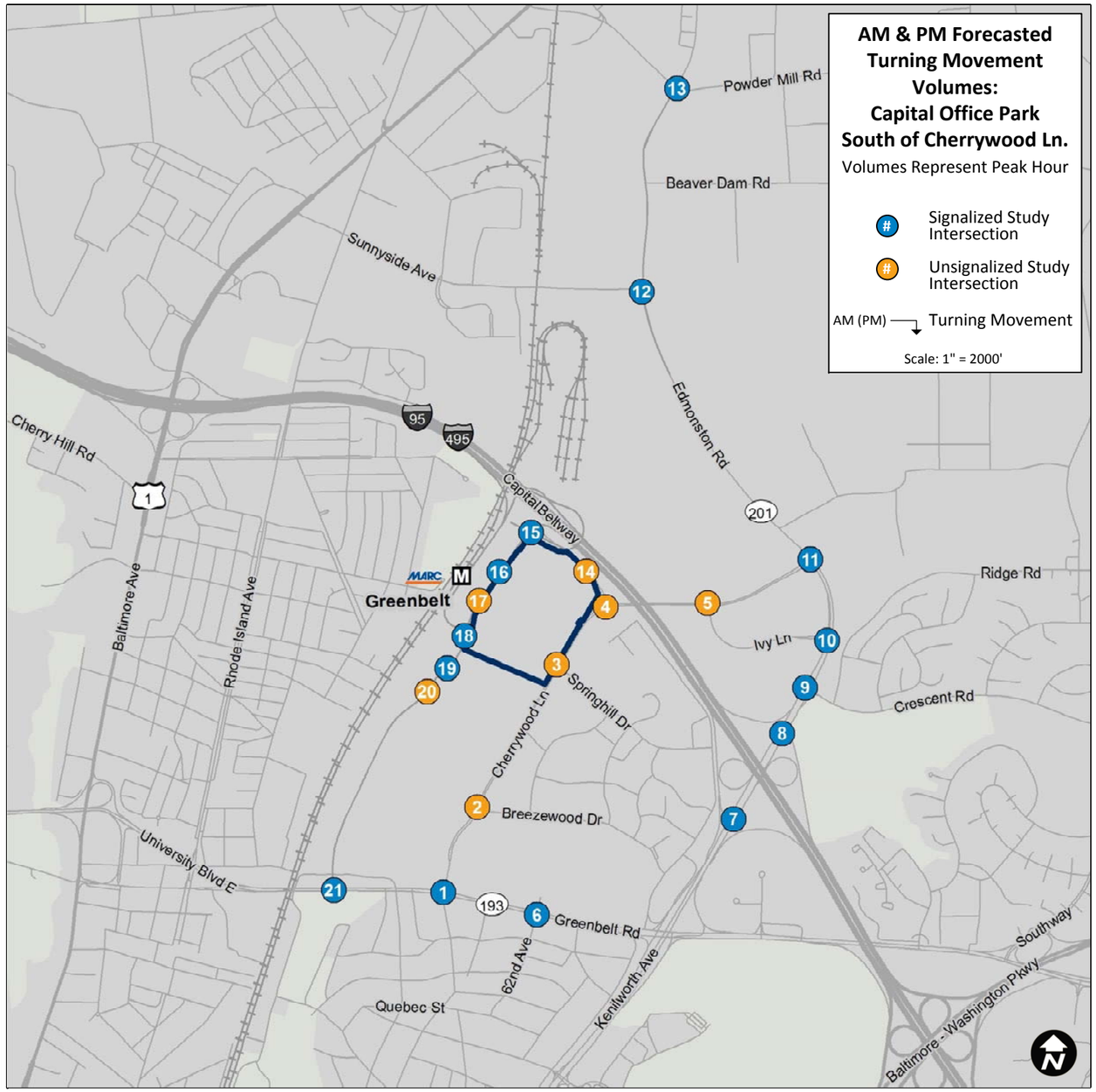
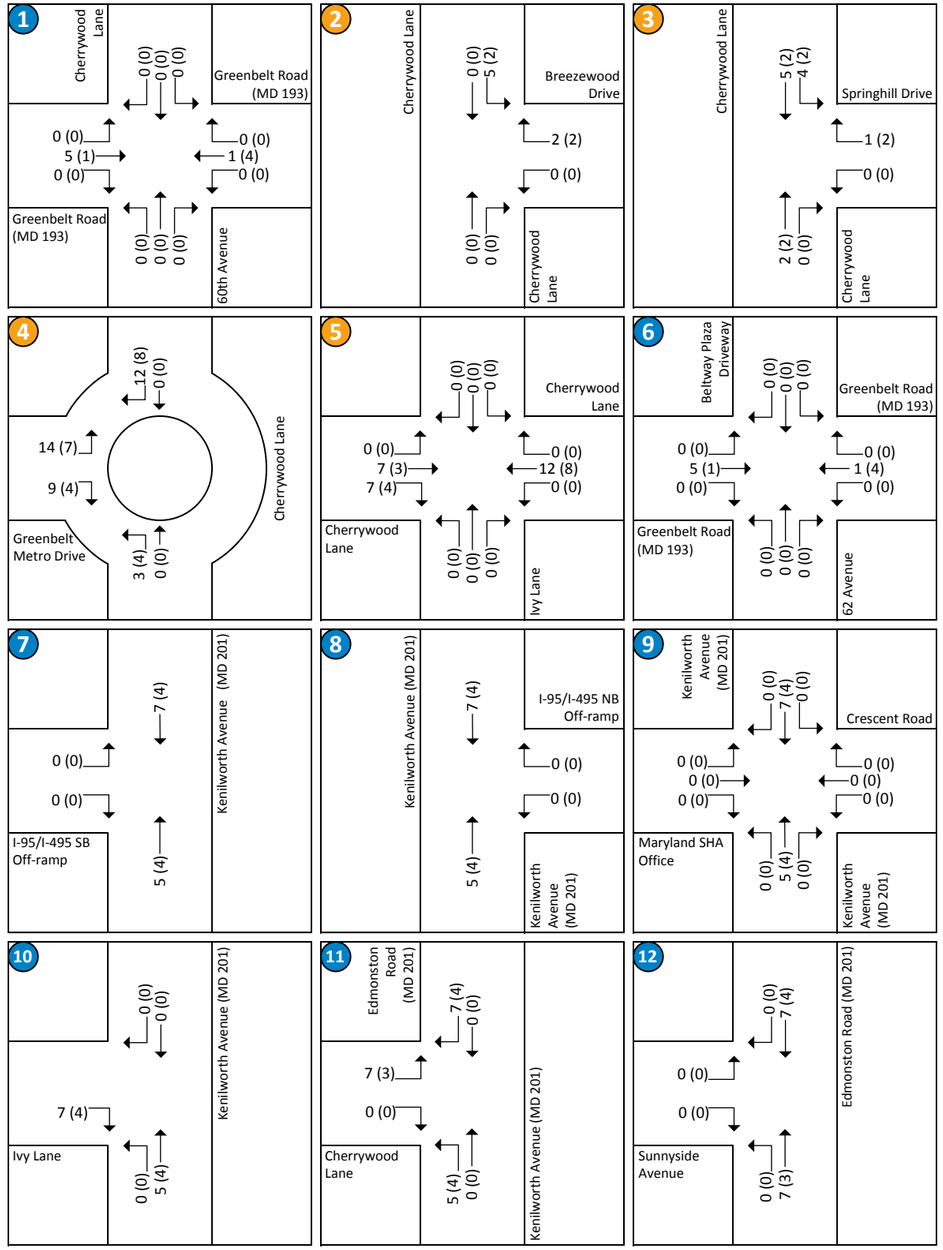
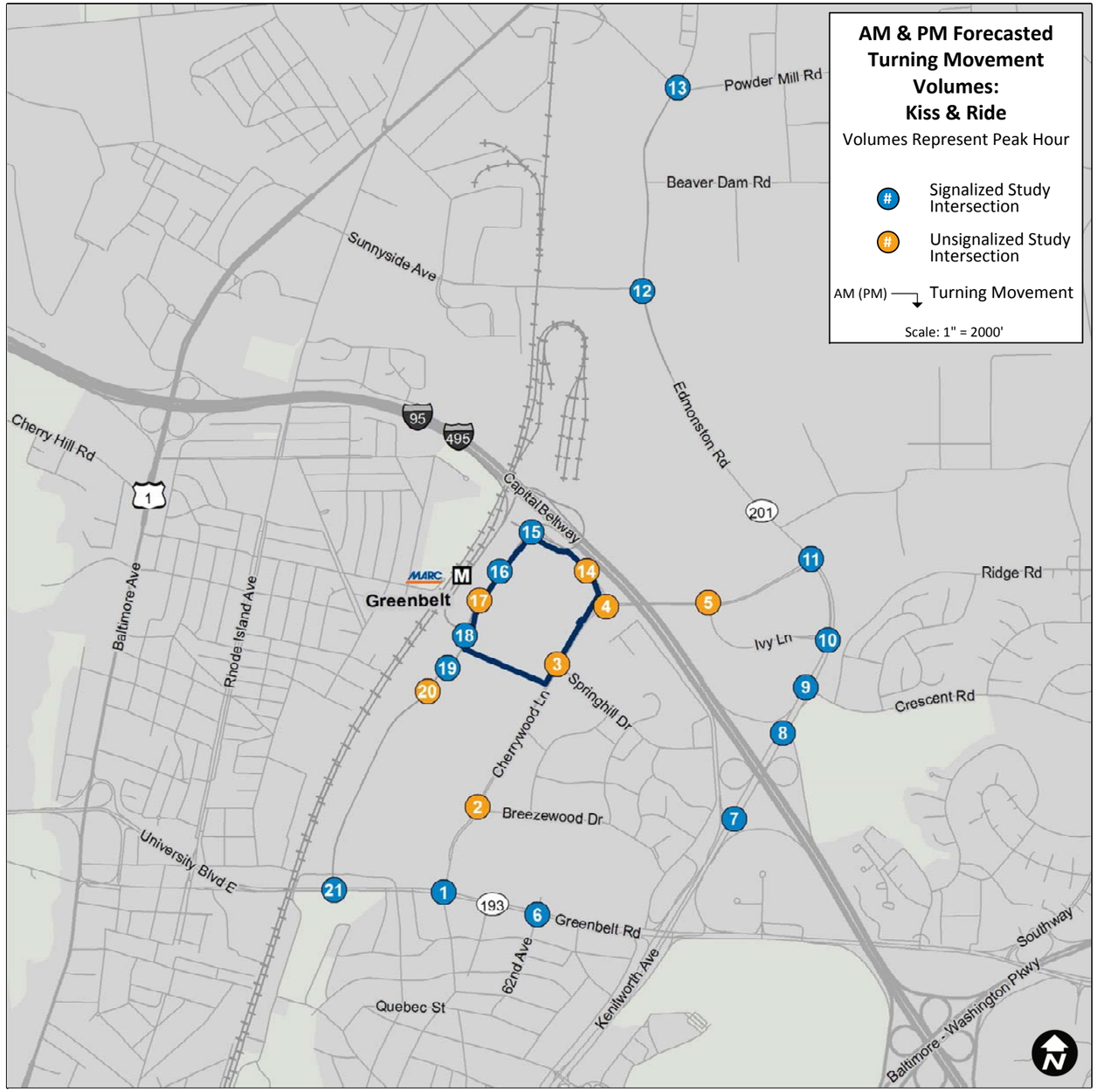
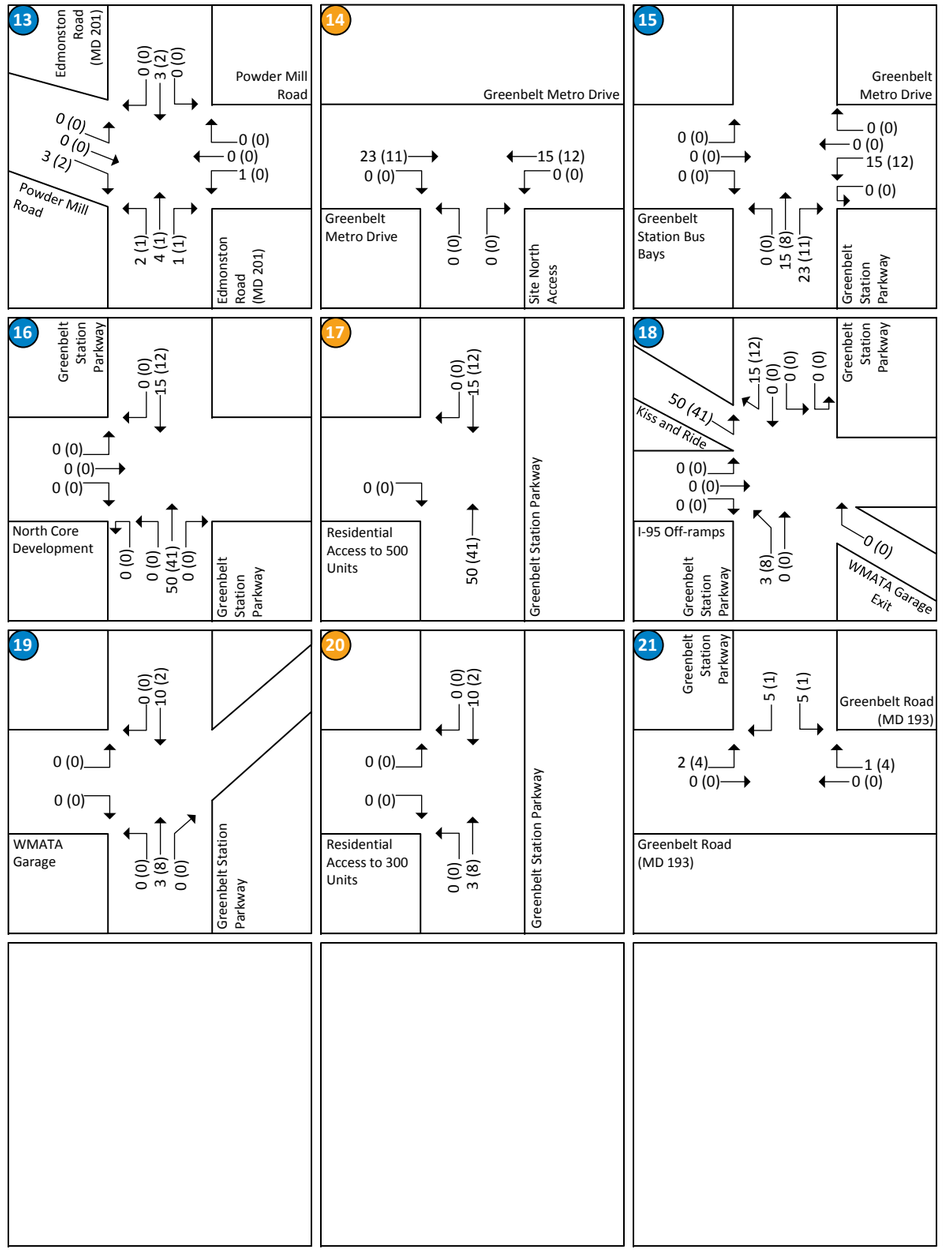
9 (2)
0 (0)
1 (8)
Greenbelt Road (MD 193)


AM & PM Forecasted Turning Movement Volumes:
Capital Office Park
South of Cherrywood Ln.
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Cherry Hill Rd
Edmonston Rd
Capital Beltway
95
495
1
201
Baltimore Ave
Rhode Island Ave
MARC
M
Greenbelt
Springhill Dr
Cherrywood Ln
Ivy Ln
Ridge Rd
Crescent Rd
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Quebec St
Kenilworth Ave
Southway
Baltimore - Washington Pkwy


1
Cherrywood Lane
Greenbelt Road (MD 193)
0 (0) 0 (0) 0 (0)
0 (0)
5 (1)
0 (0)
0 (0)
1 (4)
0 (0)
Greenbelt Road (MD 193)
0 (0) 0 (0) 0 (0)
60th Avenue
2
Cherrywood Lane
Breezewood Drive
0 (0)
5 (2)
2 (2)
0 (0)
0 (0) 0 (0)
Cherrywood Lane
3
Cherrywood Lane
Springhill Drive
5 (2)
4 (2)
1 (2)
0 (0)
2 (2) 0 (0)
Cherrywood Lane
4
12 (8)
0 (0)
14 (7)
9 (4)
Cherrywood Lane
Greenbelt Metro Drive
3 (4) 0 (0)
5
Cherrywood Lane
0 (0) 0 (0) 0 (0)
0 (0)
7 (3)
7 (4)
0 (0)
12 (8)
0 (0)
Cherrywood Lane
0 (0) 0 (0) 0 (0)
Ivy Lane
6
Beltway Plaza Driveway
Greenbelt Road (MD 193)
0 (0) 0 (0) 0 (0)
0 (0)
5 (1)
0 (0)
0 (0)
1 (4)
0 (0)
Greenbelt Road (MD 193)
0 (0) 0 (0) 0 (0)
62 Avenue
7
Kenilworth Avenue (MD 201)
7 (4)
0 (0)
0 (0)
I-95/I-495 SB Off-ramp
5 (4)
8
Kenilworth Avenue (MD 201)
7 (4)
I-95/I-495 NB Off-ramp
0 (0)
0 (0)
5 (4)
9
Kenilworth Avenue (MD 201)
0 (0) 7 (4) 0 (0)
Crescent Road
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
0 (0)
Maryland SHA Office
0 (0) 5 (4) 0 (0)
Kenilworth Avenue (MD 201)
10
0 (0) 0 (0)
7 (4)
Ivy Lane
0 (0) 5 (4)
Kenilworth Avenue (MD 201)
11
Edmonston Road (MD 201)
7 (4) 0 (0)
7 (3)
0 (0)
Cherrywood Lane
5 (4) 0 (0)
Kenilworth Avenue (MD 201)
12
0 (0) 7 (4)
0 (0)
0 (0)
Sunnyside Avenue
0 (0) 7 (3)
Edmonston Road (MD 201)


AM & PM Forecasted Turning Movement Volumes: Kiss & Ride
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Cherry Hill Rd
Edmonston Rd
Capital Beltway
95
495
201
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
University Blvd E
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Baltimore Ave
Rhode Island Ave
Southway
Baltimore - Washington Pkwy
MARC
Greenbelt
193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Edmonston Road (MD 201)
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3 (2)
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3 (2)
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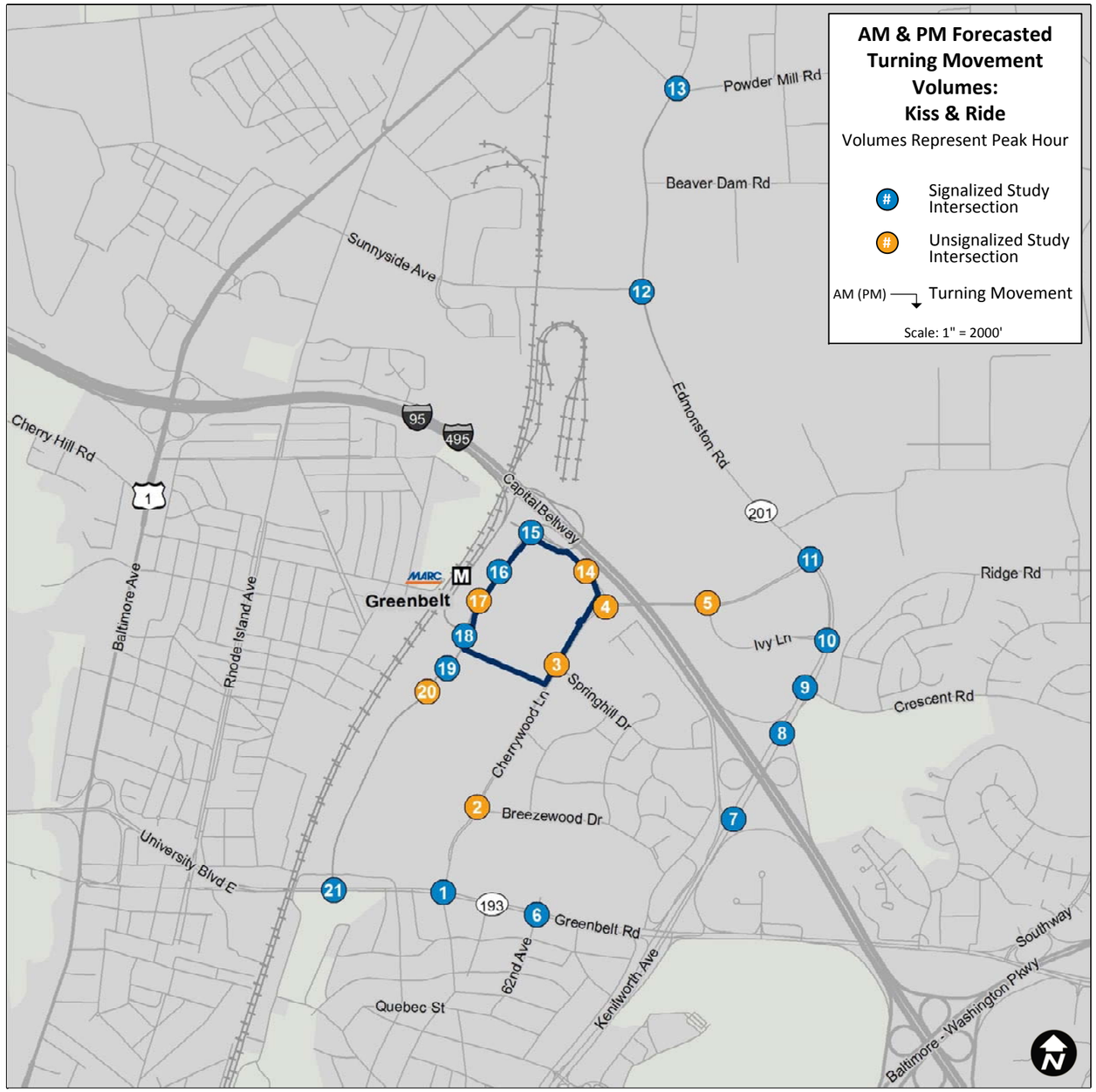
0 (0)
1 (0)
Powder Mill Road
2 (1)
4 (1)
1 (1)
Edmonston Road (MD 201)
14
Greenbelt Metro Drive
23 (11)
0 (0)
15 (12)
0 (0)
Greenbelt Metro Drive
0 (0)
0 (0)
Site North Access
15
Greenbelt Metro Drive
0 (0)
0 (0)
15 (12)
0 (0)
Greenbelt Station Bus Bays
0 (0)
15 (8)
23 (11)
Greenbelt Station Parkway
16
Greenbelt Station Parkway
0 (0)
15 (12)
0 (0)
0 (0)
0 (0)
North Core Development
0 (0)
0 (0)
50 (41)
0 (0)
Greenbelt Station Parkway
17
0 (0)
15 (12)
0 (0)
Residential Access to 500 Units
50 (41)
Greenbelt Station Parkway
18
15 (12)
0 (0)
0 (0)
0 (0)
Greenbelt Station Parkway
50 (41)
Kiss and Ride
0 (0)
0 (0)
0 (0)
I-95 Off-ramps
Greenbelt Station Parkway
3 (8)
0 (0)
0 (0)
WMATA Garage Exit
19
0 (0)
10 (2)
0 (0)
0 (0)
WMATA Garage
0 (0)
3 (8)
0 (0)
Greenbelt Station Parkway
20
0 (0)
10 (2)
0 (0)
0 (0)
Residential Access to 300 Units
0 (0)
3 (8)
Greenbelt Station Parkway
21
Greenbelt Station Parkway
5 (1)
5 (1)
Greenbelt Road (MD 193)
2 (4)
0 (0)
1 (4)
0 (0)
Greenbelt Road (MD 193)


AM & PM Forecasted Turning Movement Volumes:
Kiss & Ride
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Cherry Hill Rd
Edmonston Rd
Capital Beltway
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
Greenbelt
MARC
Baltimore Ave
Rhode Island Ave
University Blvd E
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy
95
495
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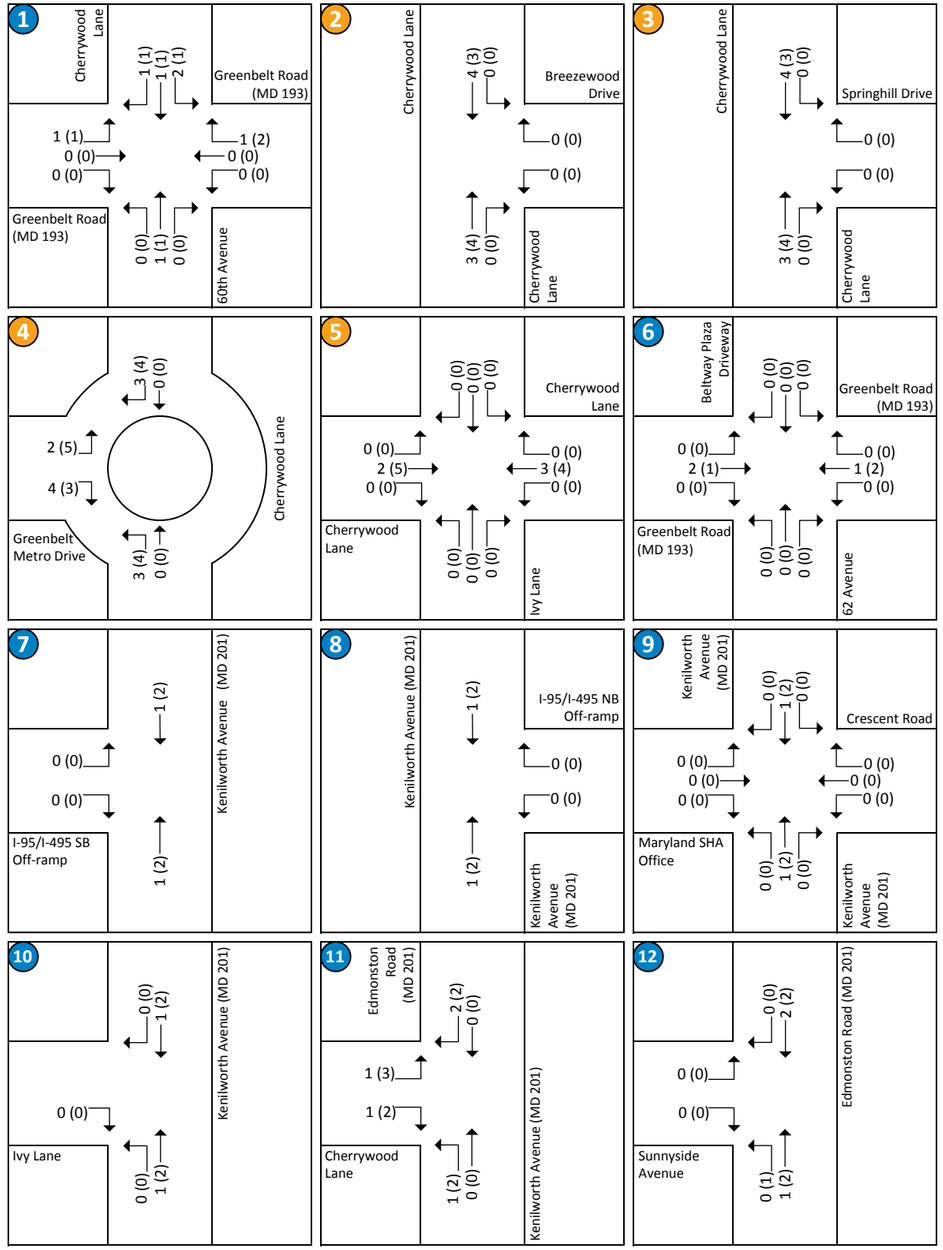
201
193


1
Cherrywood Lane
Greenbelt Road (MD 193)
Greenbelt Road (MD 193)
60th Avenue
1 (1) 1 (1) 2 (1)
1 (1) 0 (0) 0 (0)
1 (2) 0 (0) 0 (0)
0 (0) 1 (1) 0 (0)
2
Cherrywood Lane
Breezewood Drive
Cherrywood Lane
4 (3) 0 (0)
0 (0)
0 (0)
3 (4) 0 (0)
3
Cherrywood Lane
Springhill Drive
Cherrywood Lane
4 (3) 0 (0)
0 (0)
0 (0)
3 (4) 0 (0)
4
Cherrywood Lane
Greenbelt Metro Drive
3 (4) 0 (0)
2 (5)
4 (3)
3 (4) 0 (0)
5
Cherrywood Lane
Cherrywood Lane
Ivy Lane
0 (0) 0 (0) 0 (0)
0 (0) 2 (5) 0 (0)
0 (0) 3 (4) 0 (0)
0 (0) 0 (0) 0 (0)
6
Beltway Plaza Driveway
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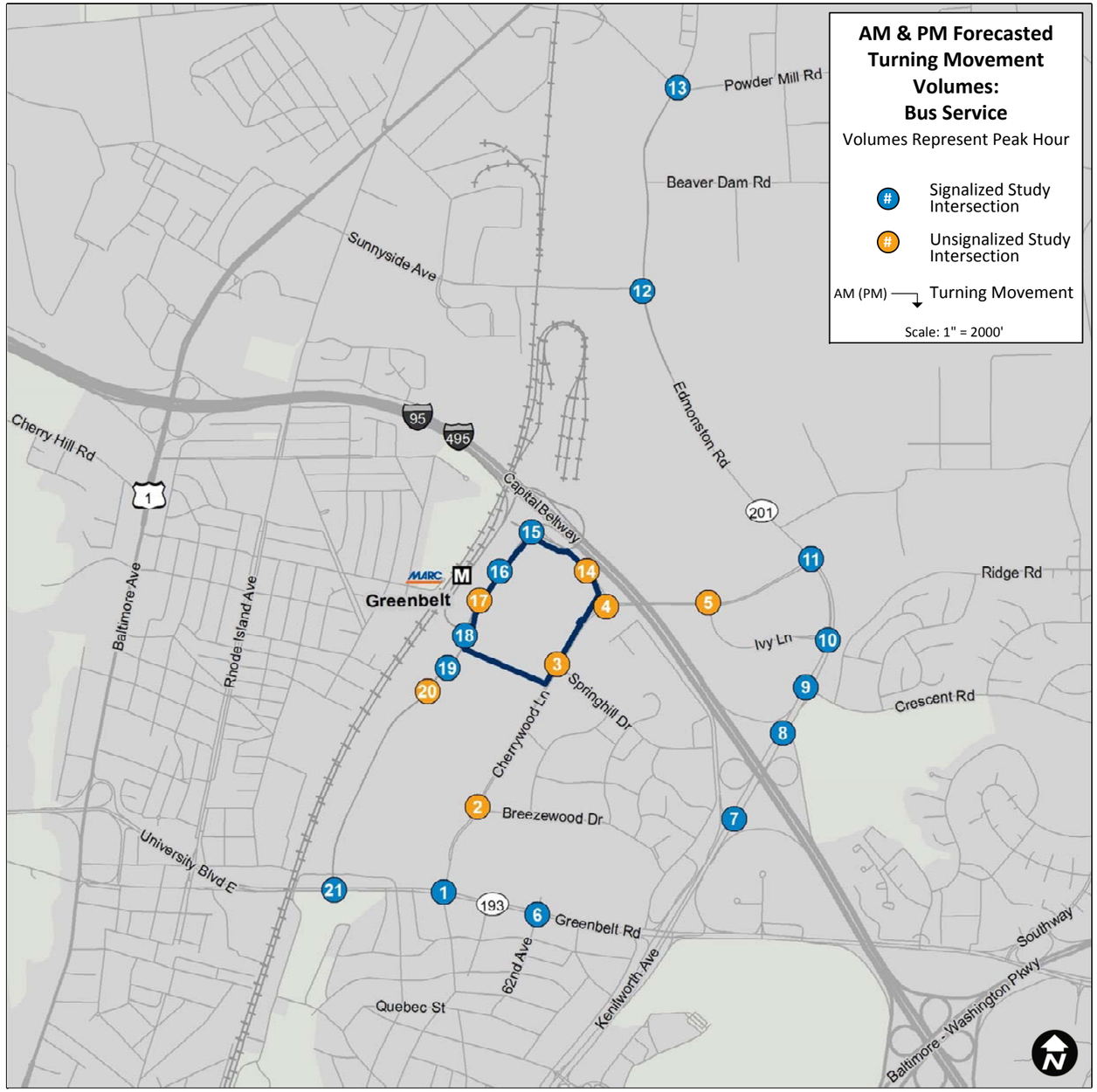
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Volumes Represent Peak Hour
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Unsignalized Study Intersection
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Sunnyside Ave
Edmonston Rd
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Baltimore Ave
Rhode Island Ave
Greenbelt
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Ridge Rd
Ivy Ln
Crescent Rd
Cherrywood Ln
Springhill Dr
Breezewood Dr
University Blvd E
Greenbelt Rd
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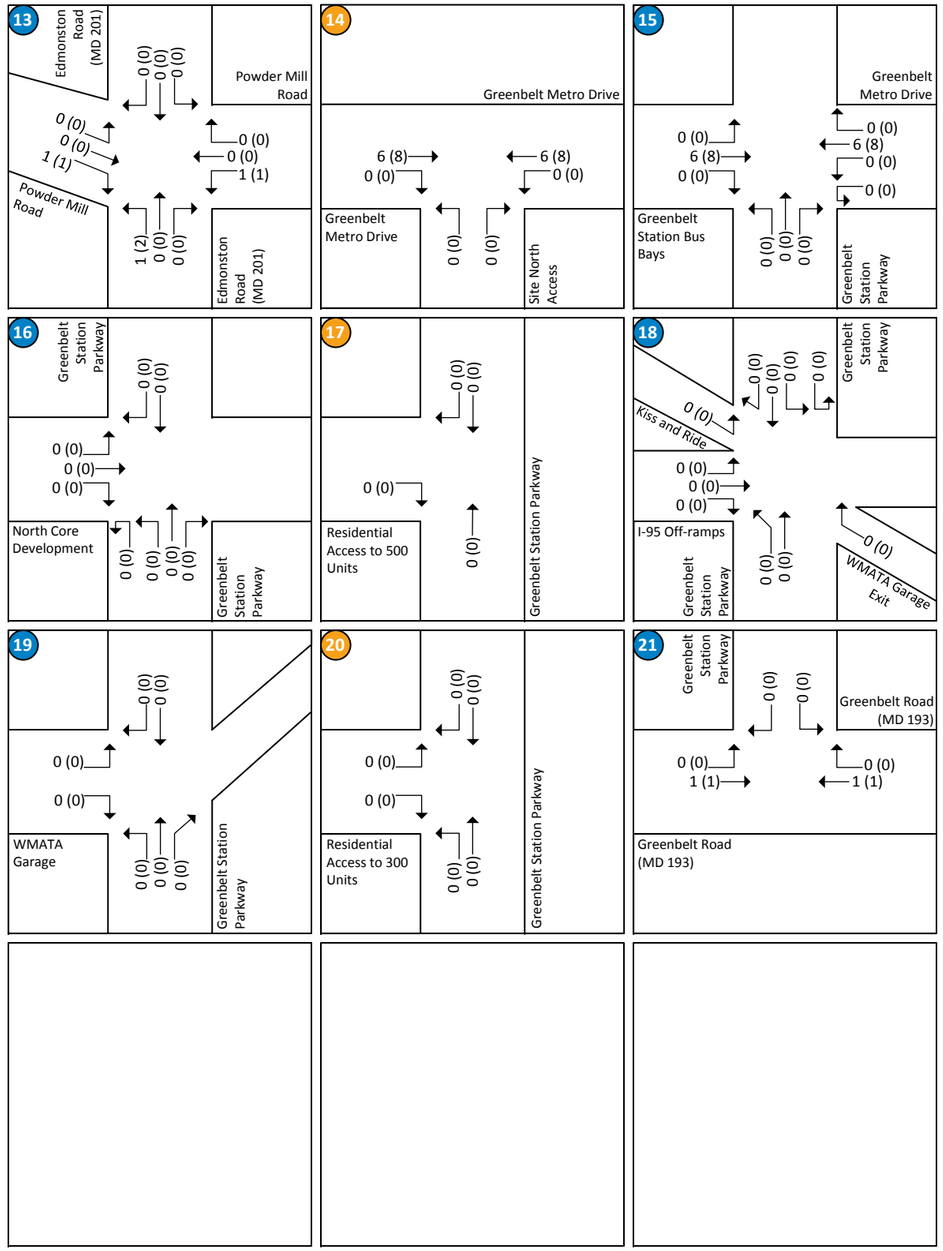
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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Greenbelt Metro Drive
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Greenbelt Station Parkway
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Residential Access to 300 Units
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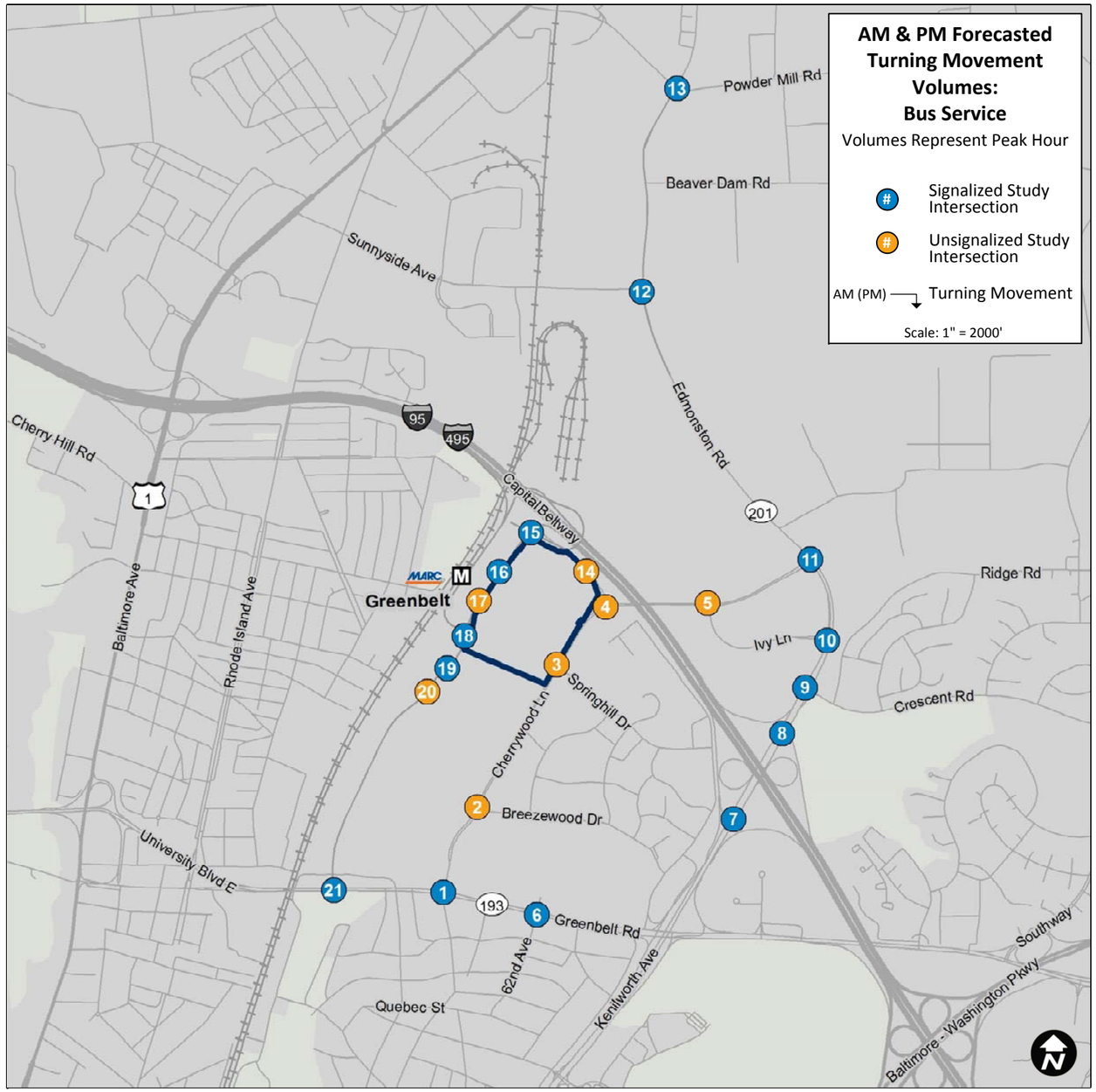
AM & PM Forecasted Turning Movement Volumes:
Bus Service
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
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Beaver Dam Rd
Sunnyside Ave
Cherry Hill Rd
Edmonston Rd
Capital Beltway
Ridge Rd
Ivy Ln
Crescent Rd
Springhill Dr
Cherrywood Ln
Breezewood Dr
Greenbelt
Baltimore Ave
Rhode Island Ave
University Blvd E
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Quebec St
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Baltimore - Washington Pkwy
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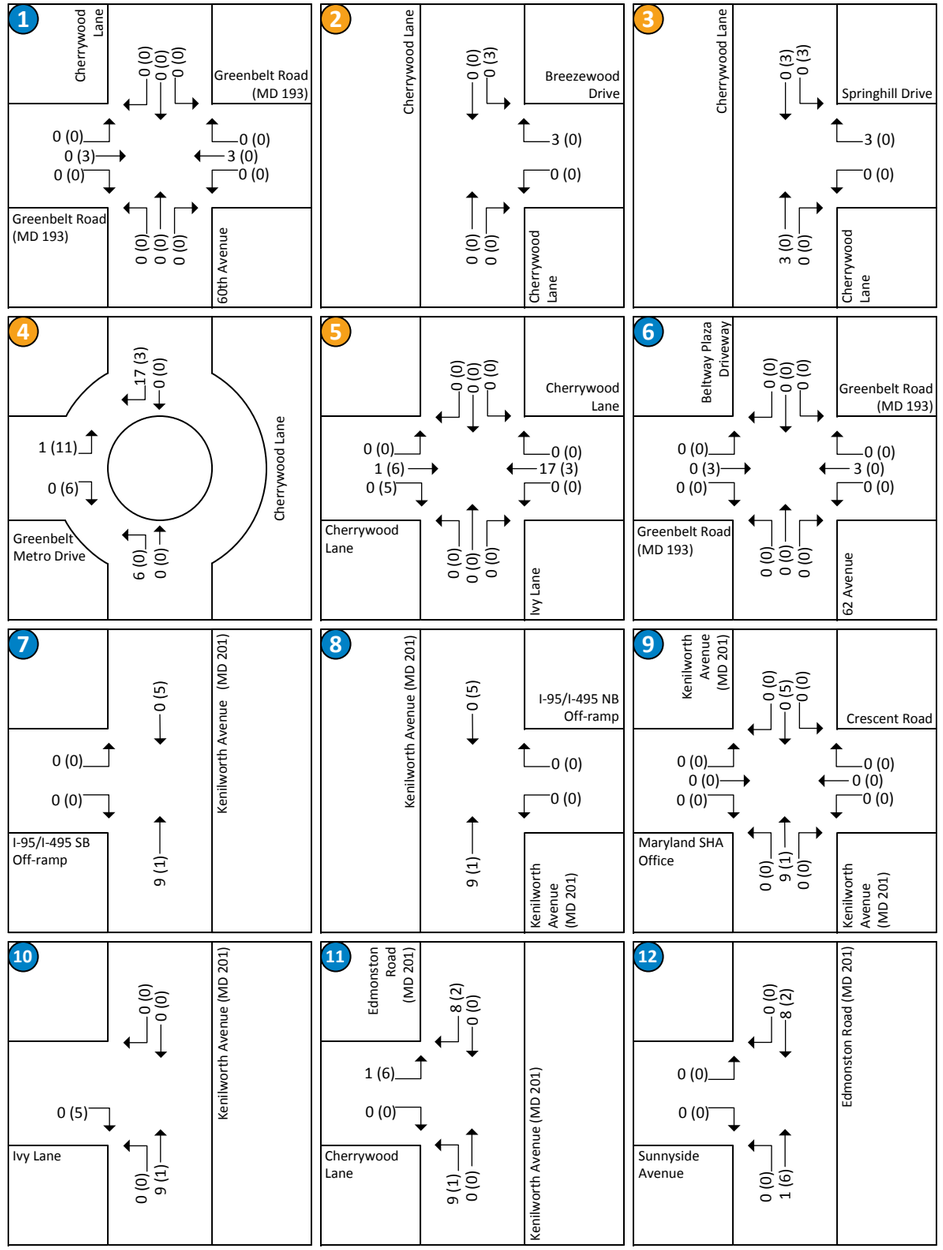
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Cherrywood Lane
Springhill Drive
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Cherrywood Lane
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Beltway Plaza Driveway
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Kenilworth Avenue (MD 201)
I-95/I-495 NB Off-ramp
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Kenilworth Avenue (MD 201)
Maryland SHA Office
Crescent Road
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Edmonston Road (MD 201)
Cherrywood Lane
Kenilworth Avenue (MD 201)
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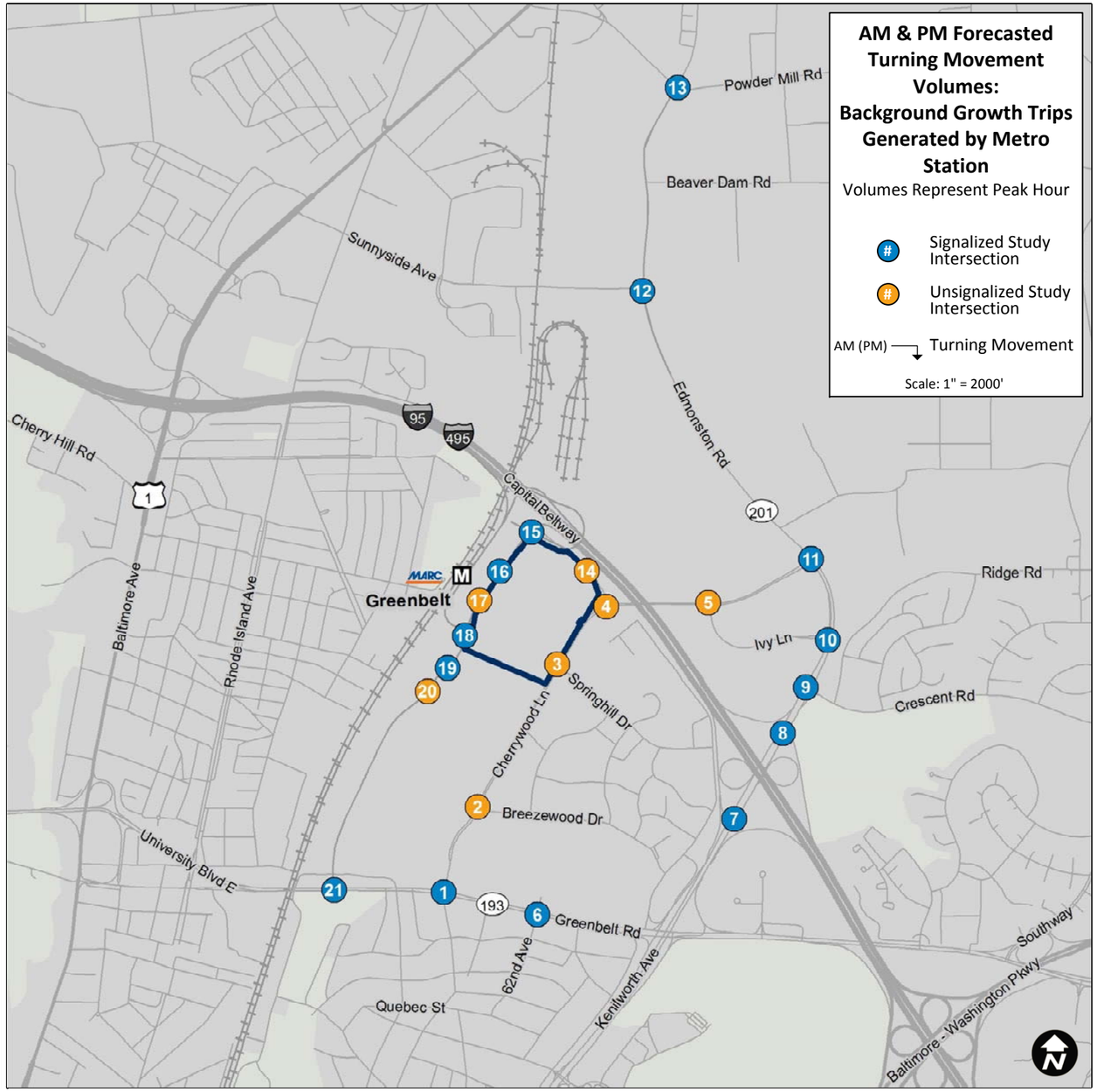
AM & PM Forecasted Turning Movement Volumes: Background Growth Trips Generated by Metro Station
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
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Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
Capital Beltway
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Baltimore Ave
Rhode Island Ave
MARC
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Greenbelt
Ridge Rd
Ivy Ln
Crescent Rd
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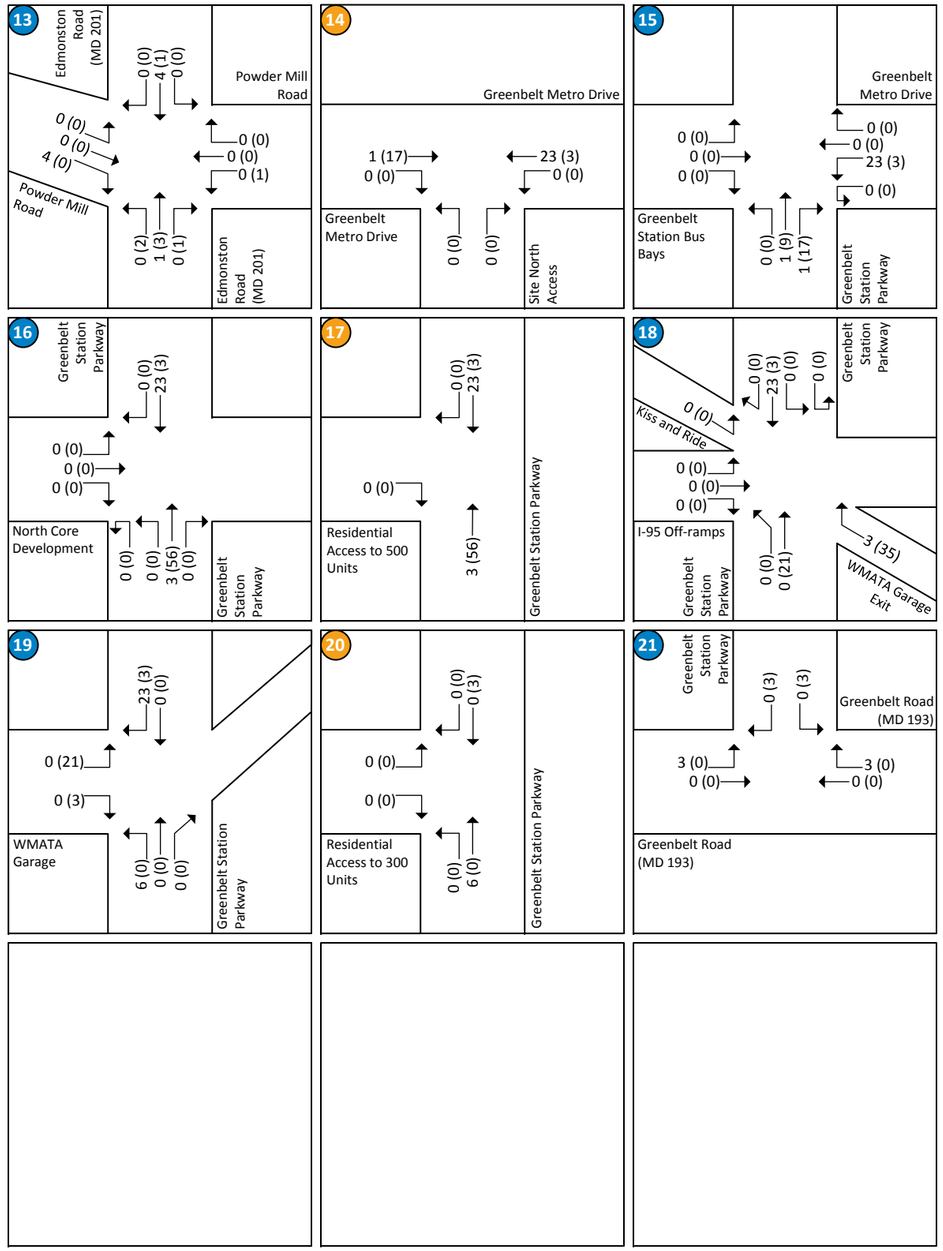
Cherrywood Ln
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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Greenbelt Station Parkway
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Residential Access to 300 Units
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Greenbelt Station Parkway
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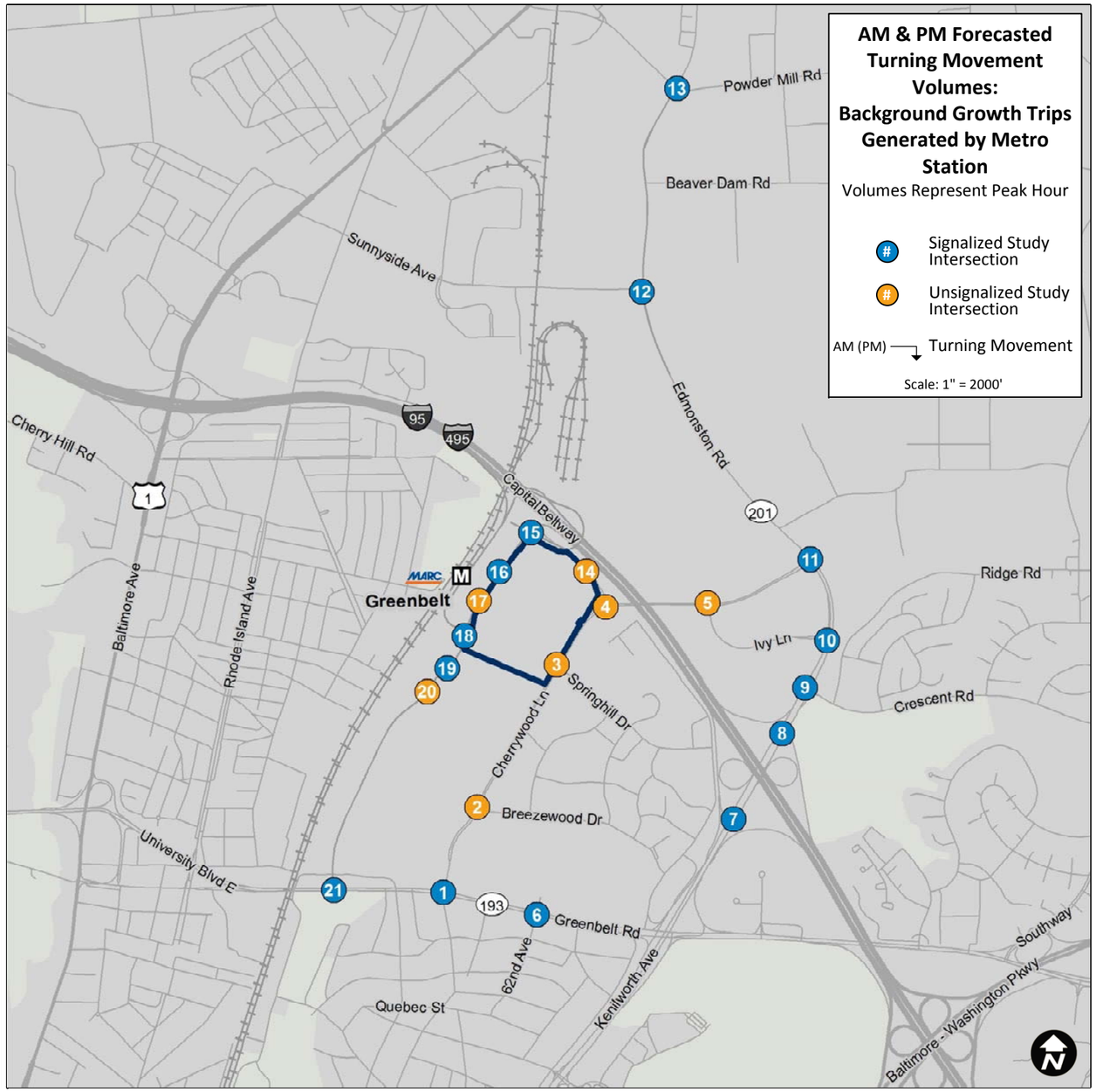
AM & PM Forecasted Turning Movement Volumes: Background Growth Trips Generated by Metro Station
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
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Capital Beltway
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Baltimore Ave
Rhode Island Ave
MARC
Greenbelt
Ridge Rd
Ivy Ln
Springhill Dr
Cherrywood Ln
Crescent Rd
Breezewood Dr
University Blvd E
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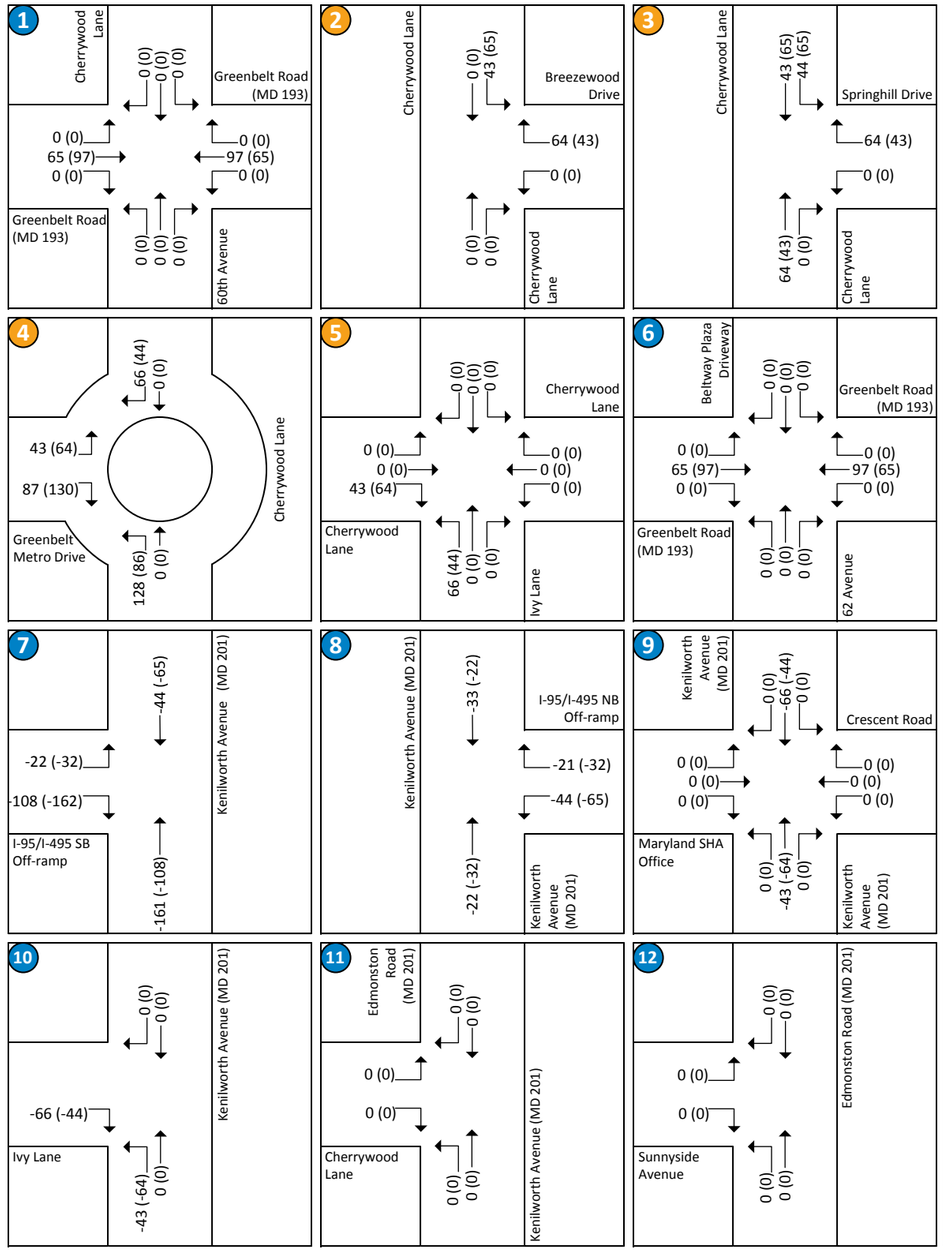
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy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Cherrywood Lane
Springhill Drive
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Cherrywood Lane
Greenbelt Metro Drive
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Kenilworth Avenue (MD 201)
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I-95/I-495 NB Off-ramp
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-21 (-32)
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-22 (-32)
9
Kenilworth Avenue (MD 201)
Maryland SHA Office
Crescent Road
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Kenilworth Avenue (MD 201)
Ivy Lane
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Edmonston Road (MD 201)
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Edmonston Road (MD 201)
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Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
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Ridge Rd
Ivy Ln
Crescent Rd
Cherrywood Ln
Springhill Dr
Breezewood Dr
University Blvd E
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy
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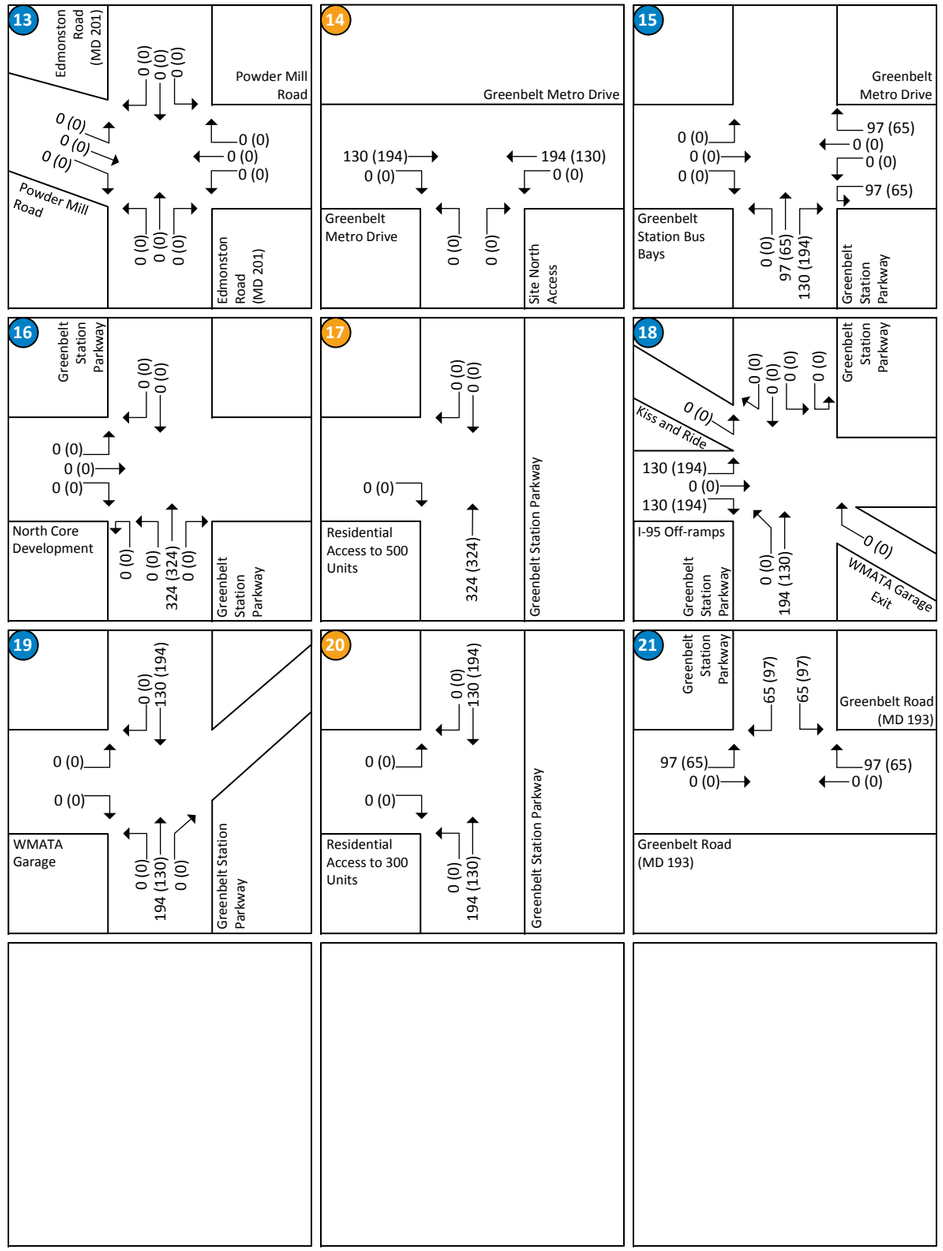
AM & PM Forecasted Turning Movement Volumes: Shifted Trips between US Route 1 and Kenilworth Ave to I-95/I-495 based on Greenbelt Station Pkwy and New Greenbelt Interchange Ramps
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM)
Turning Movement
Scale: 1" = 2000'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Greenbelt Station Parkway
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Residential Access to 500 Units
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Greenbelt Station Parkway
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Kiss and Ride
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I-95 Off-ramps
Greenbelt Station Parkway
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WMATA Garage Exit
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Greenbelt Station Parkway
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Residential Access to 300 Units
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Greenbelt Station Parkway
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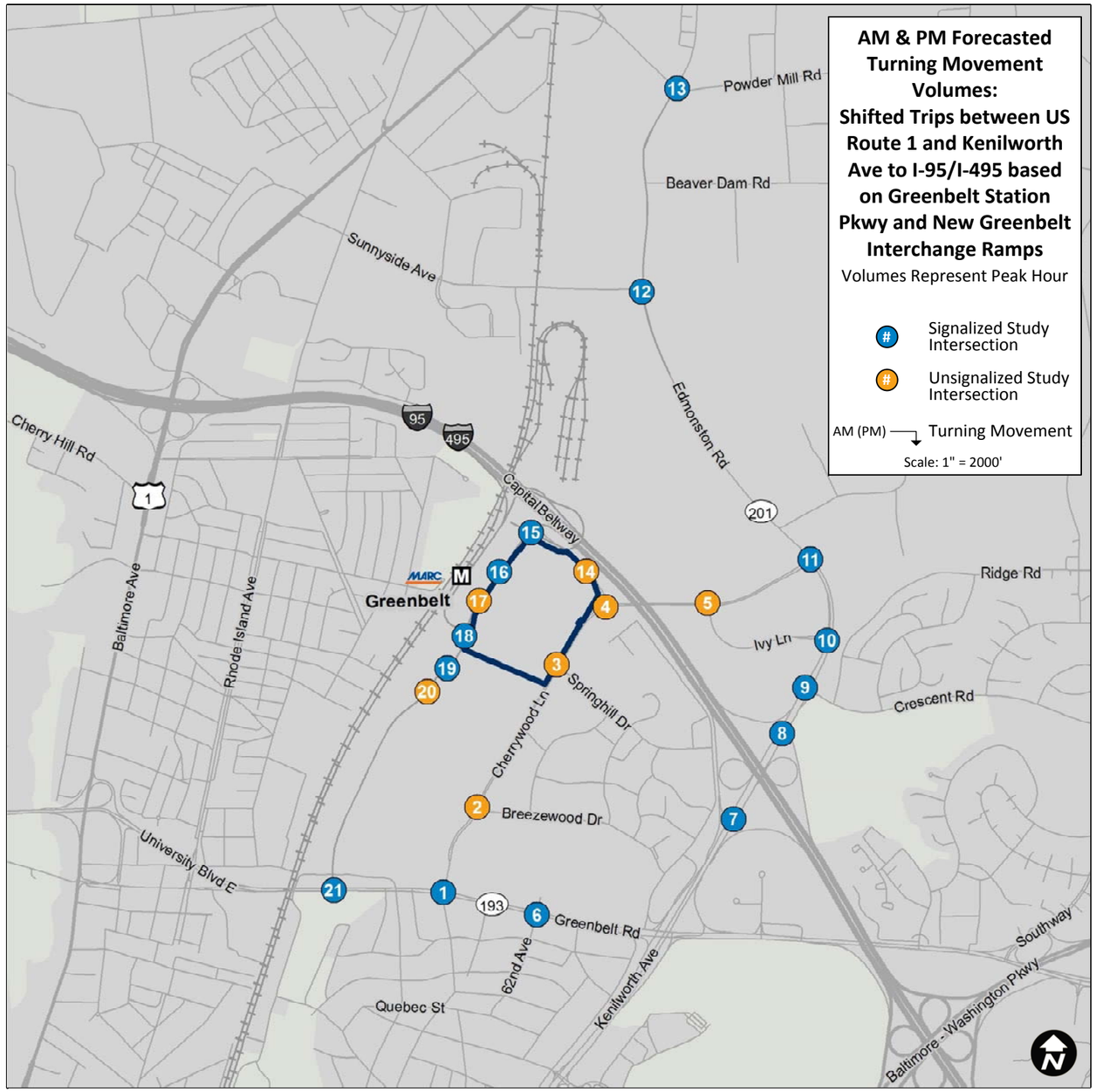
Greenbelt Road (MD 193)


AM & PM Forecasted Turning Movement Volumes:
Shifted Trips between US Route 1 and Kenilworth Ave to I-95/I-495 based on Greenbelt Station Pkwy and New Greenbelt Interchange Ramps
Volumes Represent Peak Hour
Signalized Study Intersection
Unsignalized Study Intersection
AM (PM) Turning Movement
Scale: 1" = 2000'
Powder Mill Rd
Beaver Dam Rd
Sunnyside Ave
Edmonston Rd
Cherry Hill Rd
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Capital Beltway
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Baltimore Ave
Rhode Island Ave
MARC
Greenbelt
Ridge Rd
Ivy Ln
Springhill Dr
Cherrywood Ln
Crescent Rd
Breezewood Dr
University Blvd E
193
Greenbelt Rd
62nd Ave
Kenilworth Ave
Quebec St
Southway
Baltimore - Washington Pkwy

Appendix C8

NCHRP 684 Worksheets

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

Greenbelt Site Alternative

Prepared by

Louis Berger

for

GSA

October 2015

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	FBI Consolidation EIS	**Organization:**	GSA
Project Location:	Greenbelt Site	**Performed By:**	LBG
Scenario Description:	No-build	**Date:**	
Analysis Year:	2022	**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	350,000	SQ Feet	521	469	52
Retail	820	100,000	SQ Feet	156	97	59
Restaurant				0		
Cinema/Entertainment				0		
Residential	PG County	800	units	416	79	337
Hotel	310	300	rooms	159	94	65
All Other Land Uses[2]				0		
Total				1252	739	513

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		15	0	0	0	0
Retail	17		0	0	2	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	7	3	0	0		0
Hotel	14	4	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,252	739	513
Internal Capture Percentage	10%	8%	12%
External Vehicle-Trips[3]	1,128	677	451
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	8%	29%
Retail	23%	32%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	3%	3%
Hotel	0%	28%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report* , published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	FBI Consolidation EIS	**Organization:**	GSA
Project Location:	Greenbelt Site	**Performed By:**	LBG
Scenario Description:	No-build Condition	**Date:**	
Analysis Year:	2022	**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office	710	350,000	SQ Feet	470	89	381
Retail	820	100,000	SQ Feet	599	288	311
Restaurant				0		
Cinema/Entertainment				0		
Residential	PG County	800	units	480	312	168
Hotel	310	300	rooms	180	92	88
All Other Land Uses[2]				0		
Total				1729	781	948

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		23	0	0	8	0
Retail	6		0	0	81	16
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	7	29	0	0		5
Hotel	0	6	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,729	781	948
Internal Capture Percentage	21%	23%	19%
External Vehicle-Trips[3]	1,367	600	767
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	15%	8%
Retail	20%	33%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	29%	24%
Hotel	23%	7%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report* , published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	FBI Consolidation EIS
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	469	469	1.00	52	52
Retail	1.00	97	97	1.00	59	59
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	79	79	1.00	337	337
Hotel	1.00	94	94	1.00	65	65

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		15	33	0	1	0
Retail	17		8	0	8	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	7	3	67	0		0
Hotel	49	9	6	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		31	0	0	0	0
Retail	19		0	0	2	0
Restaurant	66	8		0	4	4
Cinema/Entertainment	0	0	0		0	0
Residential	14	16	0	0		0
Hotel	14	4	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	38	431	469	431	0	0
Retail	22	75	97	75	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	2	77	79	77	0	0
Hotel	0	94	94	94	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	15	37	52	37	0	0
Retail	19	40	59	40	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	10	327	337	327	0	0
Hotel	18	47	65	47	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Project Name:	FBI Consolidation EIS
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	89	89	1.00	381	381
Retail	1.00	288	288	1.00	311	311
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	312	312	1.00	168	168
Hotel	1.00	92	92	1.00	88	88

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		76	15	0	8	0
Retail	6		90	12	81	16
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	7	71	35	0		5
Hotel	0	14	60	0	2	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		23	0	0	12	0
Retail	28		0	0	144	16
Restaurant	27	144		0	50	65
Cinema/Entertainment	5	12	0		12	1
Residential	51	29	0	0		11
Hotel	0	6	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	13	76	89	76	0	0
Retail	58	230	288	230	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	89	223	312	223	0	0
Hotel	21	71	92	71	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	31	350	381	350	0	0
Retail	103	208	311	208	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	41	127	168	127	0	0
Hotel	6	82	88	82	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Project Name:	FBI Consolidation EIS		**Organization:**	GSA
Project Location:	Greenbelt Site		**Performed By:**	LBG
Scenario Description:	No-build		**Date:**	
Analysis Year:	2022		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**		**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	820	180,000	SQ Feet	223	138	85
Restaurant				0		
Cinema/Entertainment				0		
Residential	550/350	900	units	531	103	428
Hotel				0		
All Other Land Uses[2]				0		
Total				754	241	513

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	2	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	4	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	754	241	513
Internal Capture Percentage	2%	2%	1%
External Vehicle-Trips[3]	742	235	507
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	3%	2%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	2%	1%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report* , published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	FBI Consolidation EIS	**Organization:**	GSA
Project Location:	Greenbelt Site	**Performed By:**	LBG
Scenario Description:	No-build Condition	**Date:**	
Analysis Year:	2022	**Checked By:**	
Analysis Period:	**PM Street Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail	820	180,000	SQ Feet	888	426	462
Restaurant				0		
Cinema/Entertainment				0		
Residential	550/350	900	units	610	397	213
Hotel				0		
All Other Land Uses[2]				0		
Total				1498	823	675

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	120	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	43	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,498	823	675
Internal Capture Percentage	22%	20%	24%
External Vehicle-Trips[3]	1,172	660	512
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	10%	26%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	30%	20%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report* , published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	FBI Consolidation EIS
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	138	138	1.00	85	85
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	103	103	1.00	428	428
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	25		11	0	12	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	9	4	86	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		44	0	0	0	0
Retail	0		0	0	2	0
Restaurant	0	11		0	5	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	23	0	0		0
Hotel	0	6	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	4	134	138	134	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	2	101	103	101	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	2	83	85	83	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	4	424	428	424	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Project Name:	FBI Consolidation EIS
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	426	426	1.00	462	462
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	397	397	1.00	213	213
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	9		134	18	120	23
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	9	89	45	0		6
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		34	0	0	16	0
Retail	0		0	0	183	0
Restaurant	0	213		0	64	0
Cinema/Entertainment	0	17	0		16	0
Residential	0	43	0	0		0
Hotel	0	9	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	43	383	426	383	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	120	277	397	277	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	120	342	462	342	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	43	170	213	170	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Appendix C9

TransModeler™ Validation and Calibration

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

Greenbelt Site Alternative

Prepared by

Louis Berger

for

October 2015

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C9 TransModeler™ Validation and Calibration

C9.1 Introduction

TransModeler™ Traffic Simulation Software (TransModeler™) was used to provide the entry control facility (ECF) results once the external roadway mitigation measures were determined. Prior to testing various ECF designs, the software first had to be developed to model the existing conditions through a process known as model validation and calibration. This process involves creating a model of the existing roadway study area network, validating how well a simulation compares to the actual operations, and adjusting or calibrating the model until the simulation closely resembles the network.

This appendix provides the details for developing the existing network, validating the results, and calibrating the model, if necessary.

C9.2 Developing the Existing Condition Model

The Greenbelt study area was created into TransModeler™ (also referred to as coded into the model) and contained the intersections and adjacent roadway segments along the following roadways: Greenbelt Road between 62nd Avenue and Cherrywood Lane, Cherrywood Lane between Greenbelt Road to Kenilworth Avenue/Edmonston Road, Kenilworth Avenue/Edmonston Road between Interstate (I)-95 southbound off-ramp to Powder Mill Road. Also included in the model was the I-95/I-495 mainline and ramps connecting I-95/I-495 to the Greenbelt Metro Station. Links representing the No-build Condition and Build Condition are also shown, such as the North and South Core planned roadway network, new interchange ramps between Greenbelt Station and I-95/I-495, and the Greenbelt site conceptual roadway network. However, no vehicle volumes were modeled on these links during validation and calibration. Figure C9-1 shows the modeled study area.

TransModeler™ is capable of modeling key roadway elements such as the number of lanes, lane width, speed, length of turning lanes, type of pavement striping (solid line, dashed line, barrier), channelized right-turn lanes matched to the actual or planned curve radius, lane assignments through an intersection by lane, and traffic signal timings by lane group (left, through, or right). In addition, TransModeler™ can model an ECF by lane, freeway facilities, and any other special roadway design. Each element was coded to reflect the existing condition as accurately as possible.

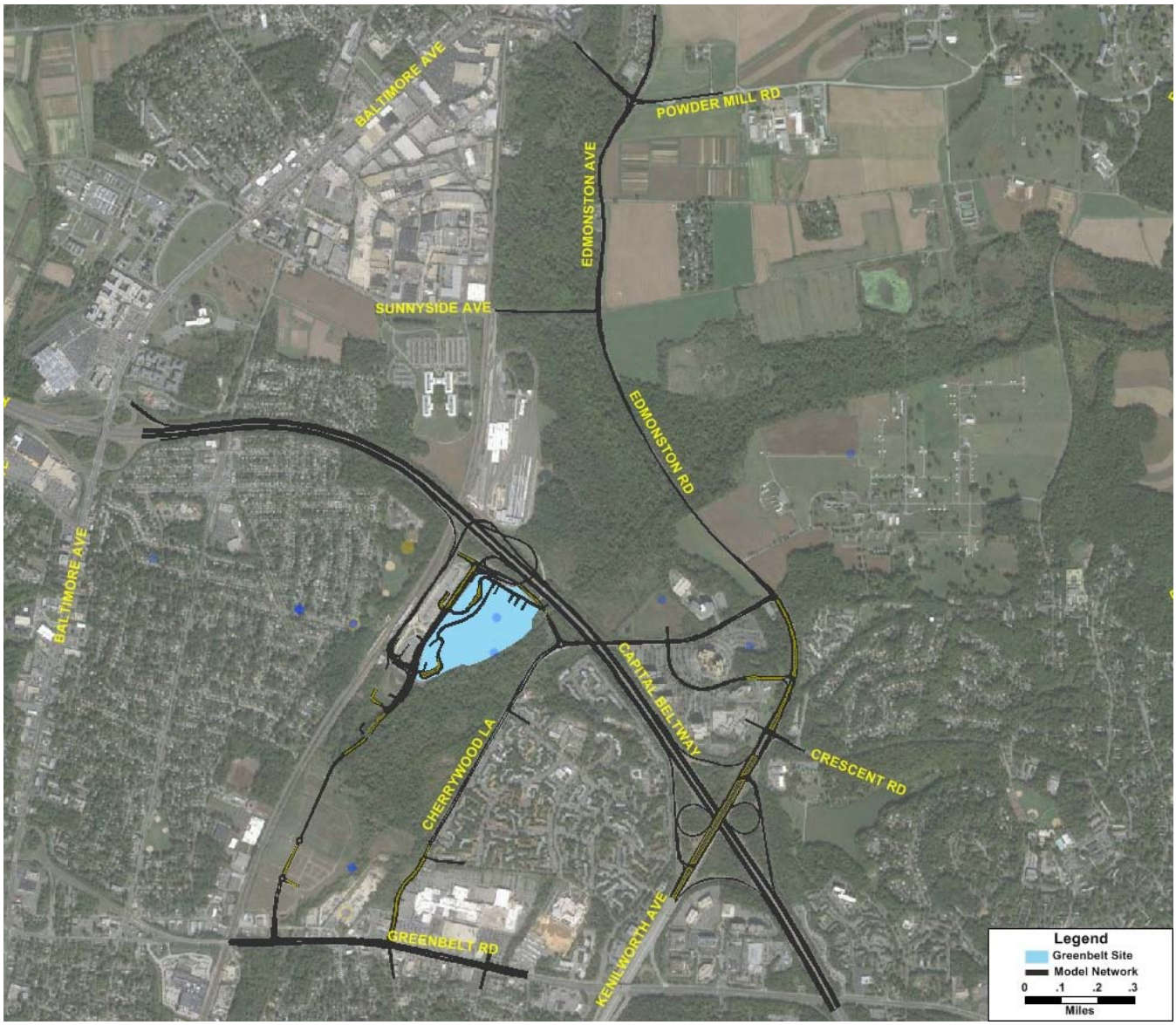
Two methods of modeling the vehicle volumes were used: (a) the hourly vehicle volumes obtained through the existing condition intersection-based manual turning movement counts or Interstate facility-based automatic traffic recorder counts, and (b) vehicle classification counts at key study area entrance locations.

C9.2.1 Vehicle Volumes

The hourly vehicle volume counts were entered for each intersection in the model and at all Interstate facilities providing a complete network of vehicle trips through the study area. Because vehicle trips occur from an origin to a destination, TransModeler™ develops a specific origin and destination by vehicle in an attempt to match the number of vehicle trips per hour coded into the model by lane group. Depending on the network complexity, the conversion from lane group volumes to origin-destination pairs can result in modeled vehicle volumes differing from the actual volumes and thus require calibration or adjustments to rectify the imbalance.

The hourly volumes entered into the model are contained in figure 3-7 (intersection turning movement volumes) in section 3.1.4 of the Transportation Impact Assessment (TIA) and figure 3-17 (Interstate facilities) in section 3.7.6 of TIA report.

Figure C9-1: Modeled Study Area



C9.2.2 Vehicle Classification

Included in the vehicle volumes are trucks, buses, passenger vehicles, small trucks, and motorcycles. Each of these vehicle types have different lengths and thus can cover more or less roadway space. A typical full-size tractor trailer can be 53 feet long while a typical passenger vehicle can be less than 25 feet long. The vehicle mix can affect traffic operations, especially if the roadway contains a high volume of larger vehicles. Each of these vehicle types also has different acceleration rates from a stopped position, and some can take longer to reach the speed limit than others, this also can affect traffic operations.

Vehicle counts separated into 13 classifications were obtained from the Maryland State Highway Administration (SHA) website covering key entrance points serving the study area network (Maryland SHA 2015). The classification counts consisted of locations serving each of the corridors modeled including Greenbelt Road, Kenilworth Road, and Edmonston Road. These classifications provide five different variations of single-unit trucks

and four different variations of multi-trailer trucks. For this study, the 13 classifications were combined into the following groups to create a simple uniform classification system ready to be entered into TransModeler™:

- Class 1: Motorcycles
- Class 2: Passenger vehicles
- Class 3: Light Trucks
- Class 4: Buses
- Classes 5–9: Single-unit Trucks
- Classes 10–13: Multi-trailer Trucks

TransModeler™ also provides an opportunity to breakout the passenger vehicles into three categories—high, middle, and low performance passenger cars—to better simulate acceleration and deceleration speeds. Following the software's default split among the three passenger vehicle classes, the total passenger vehicle volumes were distributed among three categories resulting in 33.33 percent of the passenger vehicle volume assigned to high performance, 44.44 percent of the passenger vehicle volume assigned to middle performance, and 22.22 percent of the passenger vehicle volume assigned to low performance.

Each vehicle classification count provided hourly counts for each of the 13 vehicle types. The highest total hourly AM (either 7:00 or 8:00 AM) and PM (4:00 PM or 5:00 PM) peak hour volumes were extracted and grouped to calculate the percentage for each class by peak hour by location. Table C9-1 contains a summary of the classification counts by location. All other entering locations used the average of the non-Interstate classification counts listed at the bottom of table C9-1.

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Table C9-1: Summary of Vehicle Classifications

Location	Direction	Peak Hour	Motorcycles	Passenger Vehicle (Performance)			Light Trucks	Buses	Single-unit Trucks	Multi-trailer Trucks	Total
				High	Middle	Low					
Greenbelt Road – west of Cherrywood Lane	Eastbound	AM	0%	25%	34%	17%	18%	2%	4%	0%	100%
		PM	0%	28%	37%	19%	14.5%	0%	1.5%	0%	100%
Greenbelt Road – east of 62nd Street	Westbound	AM	0%	21%	28%	14%	29%	2%	6%	0%	100%
		PM	0%	23%	30%	15%	28%	0%	4%	0%	100%
Kenilworth Avenue – south of Southbound I-95/I-495 off-ramp	Northbound	AM	0%	27%	36%	18%	12%	1%	6%	0%	100%
		PM	0%	29%	39%	20%	10%	0%	2%	0%	100%
Edmonston Road – north of Powder Mill Road	Southbound	AM	0%	24%	32%	16%	15%	2%	11%	0%	100%
		PM	0%	29%	38%	19%	9%	1%	4%	0%	100%
I-95/I-495 Northbound – south of Kenilworth Interchange	Northbound	AM	0%	26.5%	35.5%	18%	13%	2%	5%	0%	100%
		PM	0%	27%	36%	18%	13%	1.5%	4.5%	0%	100%
I-95/I-495 Southbound – north of U.S. Route 1 Interchange	Southbound	AM	0%	27%	35%	18%	12%	1%	7%	0%	100%
		PM	0%	27%	36%	18%	13%	0.5%	5.5%	0%	100%
Average of non-Interstate counts		AM	0%	25%	33%	17%	17%	1%	7%	0%	100%
		PM	0%	27%	36%	18%	14%	1%	4%	0%	100%

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C9.2.3 Validation Process

Once the network was completed by entering or coding the hourly volumes for each turning movement and designating vehicle classifications for each entrance to the network, the next step was the validation process. The validation process included visually observing the simulations, comparing the simulated vehicle turning movement volumes to the actual coded vehicle turning movement volumes, and comparing the simulated travel times to the actual travel times.

C9.2.3.1 Simulation Observation

Simulations were run to determine if the vehicle operations in the model looked reasonable based on site visit observations. Any unusual operation issues were quickly determined and addressed by fixing coding errors such as lane assignments at intersections or traffic signal timings. The observations also allowed an opportunity to catch other minor coding errors.

C9.2.3.2 Simulated Vehicle Volumes Versus Actual Vehicle Volumes

Prior to conducting the volume tests, the simulation was run 25 times to develop the minimum number of runs to be statistically accurate within plus or minus 2 percent at the 95th percentile confidence interval. Following the simulation runs, the simulated vehicle turning movement volumes were extracted based on an average of the results from the minimum number of simulation runs. The statistically accurate results were then compared to the actual turning movement volumes coded to perform each of the validation tests.

The next step in the validation process included comparing the simulated turning movement volumes by intersection approach and by intersection as a whole to actual vehicle volumes. Based on the Federal Highway Administration's (FHWA) *Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software*, three validation tests were performed to determine the accuracy of the simulation results when compared to the Exiting Condition (FHWA 2004). The first test compared the TransModeler™ simulation approach volumes at all intersections to the Existing Condition volumes for all approaches. If more than 85 percent of the approaches had less than a 15 percent difference, then the model passed the first validation test. The second test compared the TransModeler™ simulation overall intersection volumes to the Existing Condition overall intersection volumes. If more than 85 percent of the intersections had less than a 15 percent difference in overall intersection volume, then the model passed the second validation test. The third test compared the sum of all TransModeler™ simulation approach intersection volumes to the sum of all Existing Condition approach intersection volumes. If the difference between volume sums was less than 5 percent, the model passed the third validation test.

According to the results of the validation tests, the Existing Condition model passed all three tests. The approach-based test scored higher than 88 percent for both peak periods, meaning more than 88 percent of intersection approaches in the study area had less than a 15 percent difference between the simulation and Existing Condition volumes. The intersection-based test scored 92 percent, meaning 92 percent of the intersections had less than a 15 percent difference in overall intersection volume. The approach volume summation scored slightly higher than 5.0 with a 5.3 percent difference between values.

This difference is due to several factors. First the Existing Condition turning movement counts do not balance (the same number of vehicles leaving one intersection do not arrive at the next downstream intersection) between the study area intersections along Cherrywood Lane because there are additional driveways between intersections serving the corridor that provide access for vehicles to enter and exit Cherrywood Lane. The imbalance of turning movement volumes prevents TransModeler™ from creating enough origin-destination pairs to equal all the turning movement volumes. The most impacted corridor is northbound Cherrywood Lane between Breezewood

Drive and Kenilworth Avenue/Edmonston Road and the Ivy Lane northbound approach at Cherrywood Lane. Validation tests are important to determine the accuracy of the simulation runs; however, in this case, the Cherrywood Lane corridor would only account for 3 percent of the inbound FBI vehicle trips. Therefore, no further action was taken to address the approach volume issue. Table C9-2 contains the validation test results for each intersection and table C9-3 contains the validation test result summary.

Table C9-2: Approach-based Validation Test Results

#	Intersection and Approach	AM Peak Hour				PM Peak Hour			
		Existing Volume	Simulated Volume	Difference	Less than 15%	Existing Volume	Simulated Volume	Difference	Less than 15%
		Vehicles				Vehicles			
1	**Greenbelt Road (MD 193) & Cherrywood Lane/60th Avenue (Signalized)**								
	EB (Greenbelt Rd)	1,100	1,083	-1.57%	Pass	2,227	2,204	-1.03%	Pass
	WB (Greenbelt Rd)	1,798	1,772	-1.47%	Pass	1,468	1,443	-1.69%	Pass
	NB (60th Ave)	132	131	-0.95%	Pass	144	141	-1.74%	Pass
	SB (Cherrywood Ln)	460	448	-2.61%	Pass	857	828	-3.42%	Pass
	Overall	3,490	3,433	-1.63%	Pass	4,696	4,616	-1.70%	Pass
2	**Cherrywood Lane & Breezewood Drive (AWSC)**								
	WB (Breezewood Dr)	188	185	-1.46%	Pass	116	115	-0.86%	Pass
	NB (Cherrywood Ln)	318	288	-9.51%	Pass	454	421	-7.34%	Pass
	SB (Cherrywood Ln)	206	185	-10.19%	Pass	241	218	-9.47%	Pass
	Overall	712	658	-7.58%	Pass	811	754	-7.05%	Pass
3	**Cherrywood Lane & Springhill Drive (TWSC)**								
	WB (Springhill Dr)	119	119	-0.21%	Pass	169	166	-1.68%	Pass
	NB (Cherrywood Ln)	204	174	-14.71%	Pass	288	256	-11.05%	Pass
	SB (Cherrywood Ln)	198	174	-12.12%	Pass	434	403	-7.07%	Pass
	Overall	521	467	-10.41%	Pass	891	826	-7.33%	Pass
4	**Cherrywood Lane & Greenbelt Metro Drive (Roundabout)**								
	EB (Greenbelt Metro Dr)	192	193	0.39%	Pass	387	387	-0.04%	Pass
	NB (Cherrywood Ln)	370	288	-22.16%	Fail	575	453	-21.28%	Fail
	SB (Cherrywood Ln)	450	397	-11.78%	Pass	468	376	-19.62%	Fail
	Overall	1,012	878	-13.27%	Pass	1,430	1,216	-14.99%	Pass
5	**Cherrywood Lane & Ivy Lane (TWSC)**								
	EB (Cherrywood Ln)	278	229	-17.63%	Fail	491	411	-16.29%	Fail
	WB (Cherrywood Ln)	481	424	-11.90%	Pass	365	298	-18.45%	Fail
	NB (Ivy Ln)	69	44	-35.87%	Fail	125	78	-37.47%	Fail
	Overall	828	697	-15.82%	Fail	981	787	-19.79%	Fail
6	**Greenbelt Road (MD 193) & 62 Avenue/Beltway Plaza Driveway (Signalized)**								
	EB (Greenbelt Rd)	1,005	997	-0.80%	Pass	1,914	1,893	-1.10%	Pass
	WB (Greenbelt Rd)	1,654	1,635	-1.13%	Pass	1,721	1,700	-1.23%	Pass
	NB (62th Ave)	58	58	-0.43%	Pass	137	136	-0.61%	Pass
	SB (Beltway Plaza Drwy)	45	45	0.00%	Pass	382	373	-2.23%	Pass
	Overall	2,762	2,735	-0.98%	Pass	4,154	4,102	-1.24%	Pass
7	**Kenilworth Avenue (MD 201) & I-95/I-495 SB Off-ramp (Signalized)**								
	EB (I-95/I-495 SB Off-ramp)	1,398	1,390	-0.59%	Pass	1,078	1,035	-4.02%	Pass
	NB (Kenilworth Ave)	759	752	-0.92%	Pass	1,051	1,047	-0.43%	Pass
	SB (Kenilworth Ave)	203	189	-7.02%	Pass	288	272	-5.73%	Pass
	Overall	2,360	2,331	-1.25%	Pass	2,417	2,353	-2.66%	Pass

Table C9-2: Approach-based Validation Test Results (continued)

#	Intersection and Approach	AM Peak Hour				PM Peak Hour			
		Existing Volume	Simulated Volume	Difference	Less than 15%	Existing Volume	Simulated Volume	Difference	Less than 15%
		Vehicles				Vehicles			
8	**Kenilworth Avenue (MD 201) & I-95/I-495 NB Off-ramp (Signalized)**								
	WB (I-95/I-495 NB Off-ramp)	1,637	1,625	-0.75%	Pass	1,065	1,068	0.27%	Pass
	NB (Kenilworth Ave)	578	552	-4.58%	Pass	699	667	-4.58%	Pass
	SB (Kenilworth Ave)	1,054	1,033	-2.02%	Pass	1,214	1,123	-7.54%	Pass
	Overall	3,269	3,209	-1.84%	Pass	2,978	2,857	-4.05%	Pass
9	**Kenilworth Avenue (MD 201) & Crescent Road/Maryland SHA Office (Signalized)**								
	EB (Maryland SHA Office)	17	17	0.00%	Pass	24	24	0.00%	Pass
	WB (Crescent Rd)	383	381	-0.52%	Pass	206	205	-0.32%	Pass
	NB (Kenilworth Ave)	1,516	1,469	-3.10%	Pass	1,277	1,223	-4.20%	Pass
	SB (Kenilworth Ave)	1,253	1,210	-3.41%	Pass	1,750	1,600	-8.59%	Pass
	Overall	3,169	3,077	-2.90%	Pass	3,257	3,052	-6.28%	Pass
10	**Kenilworth Avenue (MD 201) & Ivy Lane (Signalized)**								
	EB (Ivy Ln)	128	99	-22.70%	Fail	406	372	-0.84%	Pass
	NB (Kenilworth Ave)	1,457	1,420	-2.56%	Pass	1,170	1,112	-4.92%	Pass
	SB (Kenilworth Ave)	1,132	1,110	-1.92%	Pass	1,321	1,206	-8.71%	Pass
	Overall	2,717	2,629	-3.24%	Pass	2,897	2,691	-7.11%	Pass
11	**Kenilworth Avenue/Edmonston Road (MD 201) & Cherrywood Lane (Signalized)**								
	EB (Cherrywood Ln)	177	139	-21.75%	Fail	485	415	-14.43%	Pass
	NB (Edmonston Rd)	1,001	974	-2.72%	Pass	989	975	-1.40%	Pass
	SB (Kenilworth Ave)	1,325	1,303	-1.68%	Pass	1,127	1,019	-9.57%	Pass
	Overall	2,503	2,415	-3.52%	Pass	2,601	2,409	-7.37%	Pass
12	**Edmonston Road (MD 201) & Sunnyside Avenue (Signalized)**								
	EB (Sunnyside Ave)	445	439	-1.46%	Pass	734	727	-1.02%	Pass
	NB (Edmonston Rd)	1,004	984	-2.02%	Pass	1,250	1,232	-1.41%	Pass
	SB (Edmonston Rd)	1,116	1,101	-1.34%	Pass	1,050	903	-14.03%	Pass
	Overall	2,565	2,523	-1.63%	Pass	3,034	2,861	-5.69%	Pass
13	**Edmonston Road (MD 201) & Powder Mill Road (Signalized)**								
	EB (Powder Mill Rd)	708	704	-0.53%	Pass	845	796	-5.76%	Pass
	WB (Powder Mill Rd)	355	350	-1.55%	Pass	272	266	-2.02%	Pass
	NB (Edmonston Rd)	1,174	1,162	-1.06%	Pass	1,476	1,442	-2.29%	Pass
	SB (Edmonston Rd)	598	593	-0.79%	Pass	657	608	-7.41%	Pass
	Overall	2,835	2,809	-0.93%	Pass	3,250	3,113	-4.21%	Pass

Notes:

AWSC = All-way STOP-Controlled unsignalized intersection

EB = Eastbound, WB = Westbound, NB= Northbound, SB = Southbound

TWSC = Two-way STOP-Controlled unsignalized intersection

Red cells denote intersections or approaches where simulated versus actual volumes were greater than a 15% difference.

Table C9-3: Validation Test Summary

	Facilities	Percent Difference	Check		Facilities	Percent Difference	Check
	AM Peak Hour				PM Peak Hour		
Number of passing approaches	38	88%	Pass		38	88%	Pass
Number of approaches	43				43		
Number of passing intersections	12	92%	Pass		12	92%	Pass
Number of intersections	13				13		
	Facilities	**Percent Difference**	**Check**		**Facilities**	**Percent Difference**	**Check**
	AM Peak Hour				PM Peak Hour		
Simulation approach volume sum	27,860	-3.1%	Pass		31,638	-5.3%	Fail
Actual approach volume sum	28,743				33,397		

C9.2.3.3 Travel Time Comparison

Based on FHWA's *Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software*, the Travel Time Comparison validation test compares the simulation travel time to the Existing Condition travel time. If the difference between the two travel times is less than 15 percent, then the model passes the test (FHWA 2004). The same simulation results as the vehicle volume test were used for this test and already accounted for the minimum number of simulation runs to be statistically accurate within plus or minus 2 percent at the 95th percentile confidence interval.

Three travel time runs were developed to capture the primary anticipated critical vehicle flows for the Build Condition. The first route followed Edmonston Road/Cherrywood Lane covering the northern portion of the study area. The second travel run followed Greenbelt Road/Cherrywood Lane covering the southeastern portion of the study area. The third travel run followed Kenilworth Avenue/Cherrywood Lane covering the eastern portion of the study area. All three routes converged at Greenbelt Metro Drive. Figure C9-2 shows the three travel time runs.

The routes were driven on January 29 and April 28, 2015, during the peak hour, which was determined through the collection of the turning movement counts (see Section 3.1.3 of the main Greenbelt TIA report). The AM peak hour was between 7:45 AM and 8:45 AM and the PM peak hour was between 5:00 PM and 6:00 PM. Two runs were conducted for both directions for each route and averaged to form a travel time value in minutes.

As a comparison, Google Maps was accessed on February 3, 2015, during the peak hours, and the travel routes were mapped to determine the actual driving time. Google Maps calculates the actual driving time based on many more samples than the two manually driven trips. The Google Maps actual driving times were compared to the manual driving times to ensure the Google Maps driving times were reasonable and more importantly were not too low, thus not taking into account traffic signal delays.

The Google Maps driving times and manual driving times were averaged to form the Existing Condition driving time to compare to the travel time calculated by TransModeler™. According to the results of the validation tests, the TransModeler™ simulations were within 15 percent of the Existing Condition travel times. Table C9-4 contains the travel time validation test summary.

Figure C9-2: Travel Time Runs

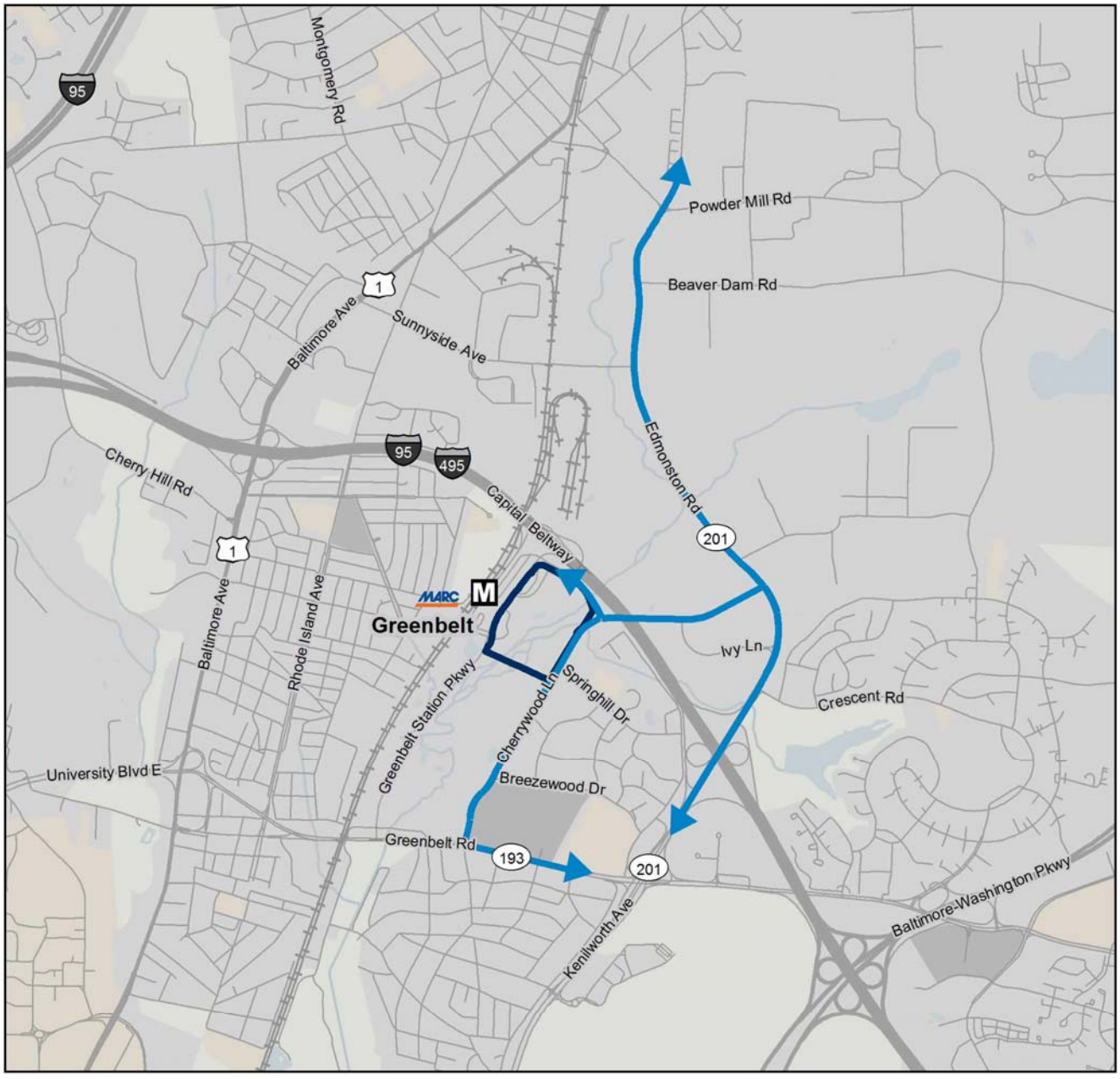

Table C9-4: Travel Time Validation Summary

Travel Runs	Direction	Manual Run [a]	Google-Maps	Trans-Modeler	Difference	Check
		minutes				
AM Peak Hour						
Greenbelt Road/Cherrywood Lane	NB	2.6	3.0	3.1	-10.1%	Pass
	SB	3.9	3.0	3.8	-10.0%	Pass
Kenilworth Avenue/Cherrywood Lane	NB	3.8	4.0	3.6	8.0%	Pass
	SB	3.9	3.0	3.0	13.0%	Pass
Edmonston Road/Cherrywood Lane	NB	6.1	6.0	5.6	7.1%	Pass
	SB	5.5	7.0	5.6	10.1%	Pass
PM Peak Hour						
Greenbelt Road/Cherrywood Lane	NB	3.9	3.0	N/A	N/A	Pass
	SB	4.9	3.0	3.7	6.1%	Pass
Kenilworth Avenue/Cherrywood Lane	NB	4.9	3.0	3.6	8.6%	Pass
	SB	3.8	3.0	3.0	12.0%	Pass
Edmonston Road/Cherrywood Lane	NB	7.3	6.0	6.1	8.5%	Pass
	SB	7.8	9.0	8.9	-6.1%	Pass

Notes:

EB = Eastbound, WB = Westbound, NB= Northbound, SB = Southbound

[a] Represents two travel time runs averaged

C9.2.4 Calibration Process

The original results calculated in the validation process had many more failing checks than presented because TransModeler™ required calibration to achieve the established goals from the FHWA report. Calibration consisted of replacing some of the manual turning movement counts with origin-destination volumes and adjusting link speeds.

C9.2.4.1 Volume Conversion to Origin-Destination Pairs

The initial turning movement volumes provided complete network coverage of vehicle volumes; TransModeler™ converts those volumes to origin-destination pairs to attempt to closely match the turning movement volumes. This process can replicate the vehicle volumes for each turning movement in a network; however, this network also contains Interstate mainlines and ramps, which can reduce the turning movements volumes at intersection approaches representing off-ramps from the Interstate. TransModeler™ tends to develop origin-destination pairs that remain on the Interstate links before creating origin-destination pairs between the Interstate and local roadway network, thus fewer vehicles exit the system than actually occur. The resolution to this issue required creating special origin-destination pairs for all background through traffic using the Interstate. Specifically, the following origin-destinations pairs were created:

- I-95/I-495 northbound from the eastern study area edge (south of the Kenilworth Avenue interchange) to the western study area edge (U.S. Route 1 interchange)

- I-95/I-495 southbound from the western study area edge (U.S. Route 1 interchange) to the eastern study area edge (south of the Kenilworth Avenue interchange)
- I-95/I-495 northbound from the eastern study area edge (south of the Kenilworth Avenue interchange) to the U.S. Route 1 off-ramp
- U.S. Route 1 southbound I-95/I-495 on-ramp from the western study area edge to the eastern study area edge (south of the Kenilworth Avenue interchange)

Once the origin-destination pairs were in place, the turning movement values representing these newly created origin-destination pair were adjusted to avoid duplication. This adjustment forced TransModeler™ to create origin-destination pairs that all exited the Interstates at the appropriate ramp because the remaining turning movement volumes only represented entering and exiting vehicles along the Interstate.

C9.2.4.1 Adjustment to Link Speeds

The link speeds were adjusted to increase the travel time along Cherrywood Lane between Springhill Drive and Kenilworth Avenue/Edmonston Road. The posted speed limit is 35 miles per hour (mph); therefore, the speed was decreased by 5 mph to 30 mph resulting in travel times closer to the values determined through an average of the manual driving time and Google Maps driving times.

C9.3 References

Federal Highway Administration (FHWA)

2004 Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software, U.S. Department of Transportation, Federal Highway Administration, Publication No. FHWA-HRT-04-040, McLean, Virginia.

Maryland State Highway Administration (Maryland SHA)

2015 Classification counts (Traffic Data). Available online at: http://shagbhisdadt.mdot.state.md.us/ITMS_Public/default.aspx, accessed January 21, 2015, and February 14,

Site Visits

1. Site visit by Louis Berger on January 28, 2015.
2. Site visit by Louis Berger on April 28, 2015.

Appendix C10

TransModeler™ Sample Size Determination Statistics

Federal Bureau of Investigation Headquarters Consolidation

Draft Transportation Impact Assessment

Greenbelt Site Alternative

Prepared by

Louis Berger

for

GSA

October 2015

C10 TransModeler™ Sample Size Determination Statistics

C10.1 Summary of Calibration Process

This appendix contains the statistical Excel sheets used to determine the appropriate number of simulation runs. The use of TransModeler™ involved calibrating a model, ensuring the model runs for the appropriate amount of time, and determining the number of simulation runs to be statistically within a plus or minus 2 percent error. Appendix C9 contains the model calibration process. Running the model included a seeding time (time for vehicles to completely travel the network) plus a 60-minute recording time. Based on the distance from the farthest points on the network, an 8-minute seed time was applied.

The minimum number of simulation runs was calculated by running the simulation for 25 runs. Based on the results of the 25 runs, the standard deviation was calculated using the vehicle hours of travel (VHT) metric. VHT provides a good indication of vehicle delays by requiring more simulations given facility operation and queuing issues. Using the calculated standard deviation, the number of simulations required was calculated to be within plus or minus 2 percent at the 95th percentile confidence level.

C10.2 Glossary of Sheet Terms

Standard Deviation – a measure that is used to quantify the amount of variation among the data values

Confidence Interval (C.I.) – an interval estimate of a parameter

Confidence Level – a range of values likely to contain the parameter of interest

Percent Error – the range of values above and below the sample statistic (or margin of error)

Number of Samples – minimum number of simulation runs required to be within plus or minus 5 percent error at 95th percentile

Mean – average vehicle hours of travel (VHT)

Required Sample Size Existing Condition AM

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	3.25123
Number of Samples	4
95% Confidence Interval	13.5789
Percent Error	**1.2%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	3.25123
Number of Samples	20
Mean	1107.45
95% Confidence Interval	3.53821

Required Sample Size Existing Condition PM

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	8.46245
Number of Samples	6
95% Confidence Interval	21.8576
Percent Error	**1.8%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	8.46245
Number of Samples	20
Mean	1205.34
95% Confidence Interval	9.20941

Required Sample Size for 2 Lanes at each Entry Control Facility (ECF)

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	23.2896
Number of Samples	14
95% Confidence Interval	31.5283
Percent Error	**2.0%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	23.2896
Number of Samples	25
Mean	1606.38
95% Confidence Interval	22.2737

Required Sample Size for 3 Lanes at South ECF and 2 Lanes at West ECF

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	17.4009
Number of Samples	10
95% Confidence Interval	29.5493
Percent Error	**2.0%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	17.4009
Number of Samples	25
Mean	1454.44
95% Confidence Interval	16.6419

Required Sample Size for 3 Lanes at each ECF

USE TO FIND REQUIRED SAMPLE SIZE	
Desired Confidence Level	95%
Sample Standard Deviation	17.8544
Number of Samples	11
95% Confidence Interval	28.3567
Percent Error	**1.9%**

USE TO TEST C.I. OF SAMPLES	
Desired Confidence Level	95%
Sample Standard Deviation	17.8544
Number of Samples	25
Mean	1453.32
95% Confidence Interval	17.0756